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HANDBOOK
OF
THE BRITISH FLORA.
ILLUSTRATED.

Hester Moggridge

June 1876

To Wilfrid Clarke

Oct. 1894

HANDBOOK

OF

THE BRITISH FLORA;

A DESCRIPTION

OF

THE FLOWERING PLANTS AND FERNS

INDIGENOUS TO, OR NATURALIZED IN,

The British Isles.

FOR THE USE OF BEGINNERS AND AMATEURS.

BY

GEORGE BENTHAM, F.R.S.,

PRESIDENT OF THE LINNEAN SOCIETY.

With Illustrations from Original Drawings by W. Fitch.

VOL. I.



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PREFACE.

THE favour with which the 'Handbook of the British Flora' has been received by the Public, renders it unnecessary here to repeat the reasons which originally induced the preparation of a work specially destined to assist the unscientific botanist in the determination of British plants. In the present edition, in order still further to facilitate that object, the publishers have called in aid the experienced talent of Mr. W. Fitch, who has supplied original drawings of every species included in the Flora. In bringing these illustrations within a compass which should enable their being printed in with the text, the Artist has had to contend not only with the general difficulty of expressing the characteristic features of a plant on so reduced a scale, but also of representing, within spaces nearly uniform in compass, specimens which in nature are so enormously different in size. This he has endeavoured in some measure to accomplish by including in the figure a larger or smaller portion of the plant; but circumstances do not admit of this being done to any great extent. In order to give the prominent characters of the species it was necessary to adopt a scale of reduction varying almost for each one. The reader must therefore be careful, in judging of the relative size of the foliage, flowers, etc., of two species, not to be misled by their apparent size in the illustrations, without checking it by the dimensions given in the text. The dissections which accompany each figure have been generally taken from the artist's own specimens, the organs selected by him for illustration being those which appeared to him the most characteristic of the species or genus.

The text has undergone a careful revision, by the Author correcting such errors as a frequent practical use of the work, as well as the suggestions of friends, have pointed out. A few alterations have been made in some of the Analytical Keys, in cases where difficulties had been experienced in arriving at the names of anomalous species. In the stations or habitats, those connected with the Irish Flora have been considerably modified, chiefly in consequence of the valuable notes communicated by Mr. Isaac Carroll, of Cork. The Author has also availed himself of important hints received from Professor Oliver and from Mr. E. Skepper, of Bury St. Edmund's, as well as of detached observations on the part of numerous friends and correspondents, or gleaned from published criticisms of the 'Handbook.'

In the general arrangement of the families and genera, although the progress of the investigations undertaken in conjunction with Dr. Hooker for the 'Genera Plantarum' have suggested several alterations, these have not appeared to be of sufficient importance to disturb the order previously adopted, excepting in the case of the Purslane Family (*Portulacæ*) and the Paronychia Family, which have been removed from Calycifloræ, to be placed, the former next to the Pink Family (*Caryophylleæ*), the latter next to the Amaranth Family, among Monochlamyds. The Author regrets that it was not till after the publication of the eighth part (pp. 281-320) that a detailed examination of Haloragææ for the 'Australian Flora' had convinced him that recent botanists were correct in removing that group to some distance from the Oenothera Family (*Onograrieæ*), under which they are still here included, after the example of the earlier followers of the Jussieuan method.

The great reduction in the number of supposed species adopted in the 'Handbook' has been severely criticized and strongly condemned by botanists of eminence, chiefly among those who have devoted themselves to the investigation of the Flora of Europe alone or of its separate States. On the other hand, the Author has more than ever reason to believe that the line he has adopted is in strict conformity with the

views of several of the first botanists of the day, who have been in the habit of considering each species with reference to the forms it may assume over the whole extent of its area. There is no doubt that in the case of a large number of common and widely-spread plants, such as the Water Crowfoots, the Briar Roses, the Brambles, Hawkweeds, Willows, etc., there are numerous races of greater or less permanency, which are more or less positively distinct, and well worthy of being studied as such by those who have leisure and patience to devote themselves to the subject, and which should by no means be neglected by the botanist who would be thoroughly grounded in his knowledge of plants; yet it is believed, that with the general advance of science, the conviction is gradually spreading that the raising these races to the rank of species is giving them an undue importance, and that it is at once more philosophical and more practically convenient, as well to the general botanist in the higher branches of the science as to the more superficial amateur, to retain for the meaning of a species the limits affixed by the original principles of Linnæus. The only change which the Author has made in this respect in the present edition is the admission as species of the *Ivy Ranunculus* (*R. hederaceus*) and the *green Spleenwort* (*Asplenium viride*), in which cases his own opinions may not be sufficiently established to interfere with the authority of general custom, and of the *intermediate Bladderwort* (*Utricularia media*), on the authority of Irish botanists, the Author himself being very imperfectly acquainted with the plant. With regard to the charge of having based his views upon the study of herbarium specimens alone, the Author can only reply that this is a mistake, and repeat from his former Preface that his generalizations are chiefly "founded on personal observation of living plants, made during many years' residence on the Continent as well as in this country, and on repeated comparison of specimens collected from the most varied and distant points of the geographical areas of the several species."

Four species have been added in the present edition: the *Claytonia*, introduced from America, but now generally established as a weed of

cultivation in many English counties; the *Earthnut Pea* (*Lathyrus tuberosus*), perhaps originally introduced, but now shown to have been long established in Essex cornfields; and the *Bermuda Sisyrinchium* and two-leaved *Smilacina* (May-Lily), which have been proved to be truly indigenous. The *Allsike Clover* (*Trifolium hybridum*) is now becoming in several counties so common along roadsides and ditches, that it will probably in future have to be included in our Floras. The characters and circumscription of the *small Sparganium* and one or two other species, which were in some respects mistaken in the first edition, have been corrected in the present one.

The Outlines of Botany, serving also as a Glossary of technical terms, included in the Introduction to the first edition, are here again inserted in the revised form sanctioned by Sir William Hooker for the series of Colonial Floras now publishing, embodying the amendments first proposed by Dr. Harvey in the Introduction to his Cape Flora.

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INTRODUCTION.

I. OUTLINES OF BOTANY, WITH SPECIAL REFERENCE TO LOCAL FLORAS.

CHAP. I.—DEFINITIONS AND DESCRIPTIVE BOTANY.

1. The principal object of a **Flora** of a country, is to afford the means of *determining* (*i.e.* ascertaining the name of) any plant growing in it, whether for the purpose of ulterior study or of intellectual exercise.

2. With this view, a Flora consists of descriptions of all the wild or native plants contained in the country in question, so drawn up and arranged that the student may identify with the corresponding description any individual specimen which he may gather.

3. These descriptions should be *clear, concise, accurate, and characteristic*, so as that each one should be readily adapted to the plant it relates to, and to no other one; they should be as nearly as possible arranged under *natural* (184) divisions, so as to facilitate the comparison of each plant with those nearest allied to it; and they should be accompanied by an *artificial key* or index, by means of which the student may be guided step by step in the observation of such peculiarities or *characters* in his plant, as may lead him, with the least delay, to the individual description belonging to it.

4. For descriptions to be clear and readily intelligible, they should be expressed as much as possible in ordinary well-established language. But, for the purpose of accuracy, it is necessary not only to give a more precise technical meaning to many terms used more or less vaguely in common conversation, but also to introduce purely technical names for such parts of plants or forms as are of little importance except to the botanist. In the present chapter it is proposed to define such *technical* or *technically limited* terms as are made use of in these Floras.

5. At the same time mathematical accuracy must not be expected. The forms and appearances assumed by plants and their parts are infinite. Names cannot be invented for all; those even that have been proposed are too numerous for ordinary memories. Many are derived from supposed resemblances to well-known forms or objects. These resemblances are differently appreciated by different persons, and the same term is not only differently applied by two different botanists, but it frequently happens that the same writer is led on different occasions to give somewhat different meanings to the same word. The botanist's endeavours should always be, on the one hand, to make as near an approach to precision as circumstances will allow, and on the other hand to

avoid that prolixity of detail and overloading with technical terms which tends rather to confusion than clearness. In this he will be more or less successful. The aptness of a botanical description, like the beauty of a work of imagination, will always vary with the style and genius of the author.

§ 1. *The Plant in General.*

6. The **Plant**, in its botanical sense, includes every being which has *vegetable life*, from the loftiest tree which adorns our landscapes, to the humblest moss which grows on its stem, to the mould or fungus which attacks our provisions, or the green scum that floats on our ponds.

7. Every portion of a plant which has a distinct part or *function* to perform in the operations or phenomena of vegetable life is called an **Organ**.

8. What constitutes *vegetable life*, and what are the functions of each organ, belong to *Vegetable Physiology*; the microscopical structure of the tissues composing the organs, to *Vegetable Anatomy*; the composition of the substances of which they are formed, to *Vegetable Chemistry*; under *Descriptive and Systematic Botany* we have chiefly to consider the forms of organs, that is, their *Morphology*, in the proper sense of the term, and their general structure so far as it affects classification and specific resemblances and differences. The terms we shall now define belong chiefly to the latter branch of Botany, as being that which is essential for the investigation of the Flora of a country. We shall add, however, a short chapter on Vegetable Anatomy and Physiology, as a general knowledge of both imparts an additional interest to and facilitates the comparison of the characters and affinities of the plants examined.

9. In the more perfect plants, their organs are comprised in the general terms **Root, Stem, Leaves, Flowers, and Fruit**. Of these the three first, whose function is to assist in the growth of the plant, are *Organs of Vegetation*; the flower and fruit, whose office is the formation of the seed, are the *Organs of Reproduction*.

10. All these organs exist, in one shape or another, at some period of the life of most, if not all, *flowering plants*, technically called *phanogamous* or *phanerogamous plants*; which all bear some kind of flower and fruit in the botanical sense of the term. In the lower classes, the ferns, mosses, fungi, moulds or mildews, seaweeds, etc., called by botanists *cryptogamous plants*, the flowers, the fruit, and not unfrequently one or more of the organs of vegetation, are either wanting, or replaced by organs so different as to be hardly capable of bearing the same name.

11. The observations comprised in the following pages refer exclusively to the flowering or phanogamous plants. The study of the cryptogamous classes has now become so complicated as to form almost a separate science. They are therefore not included in these introductory observations, nor, with the exception of ferns, in the present Flora.

12. **Plants** are

Monocarpic, if they die after one flowering-season. These include *Annuals*, which flower in the same year in which they are raised from seed; and *Biennials*, which only flower in the year following that in which they are sown.

Caulocarpic, if, after flowering, the whole or part of the plant lives through the winter and produces fresh flowers another season. These include *Herbaceous perennials*, in which the greater part of the plant dies after flowering, leaving only a small perennial portion called the Stock or Caudex, close to or within the earth; *Undershubs*, *suffruticose* or *suffrutescent* plants, in which the flowering branches, forming a considerable portion of the plant, die down after flowering, but leave a more or less prominent perennial and woody base; *Shrubs* (*frutescent* or *fruticose plants*), in which the perennial woody part

forms the greater part of the plant, but branches near the base, and does not much exceed a man's height; and *Trees* (*arboreous* or *arborescent plants*) when the height is greater and forms a woody *trunk*, scarcely branching from the base. *Bushes* are low, much-branched shrubs.

13. The terms *Monocarpic* and *Caulocarpic* are but little used, but the other distinctions enumerated above are universally attended to, although more useful to the gardener than to the botanist, who cannot always assign to them any precise character. Monocarpic plants, which require more than two or three years to produce their flowers, will often, under certain circumstances, become herbaceous perennials, and are generally confounded with them. Truly perennial herbs will often commence flowering the first year, and have then all the appearance of annuals. Many tall shrubs and trees lose annually their flowering branches like undershrubs. And the same botanical species may be an annual or a perennial, a herbaceous perennial or an undershrub, an undershrub or a shrub, a shrub or a tree, according to climate, treatment, or variety.

14. Plants are usually *terrestrial*, that is, growing on earth, or *aquatic*, *i. e.* growing in water; but sometimes they may be found attached by their roots to other plants, in which case they are *epiphytes* when simply growing upon other plants without penetrating into their tissue, *parasites* when their roots penetrate into and derive more or less nutriment from the plant to which they are attached.

15. The simplest form of the perfect plant, the annual, consists of—

(1) The **Root**, or descending axis, which grows downwards from the stem, divides and spreads in the earth or water, and absorbs food for the plant through the extremities of its branches.

(2) The **Stem**, or ascending axis, which grows upwards from the root, branches and bears first one or more leaves in succession, then one or more flowers, and finally one or more fruits. It contains the tissues or other channels (217) by which the nutriment absorbed by the roots is conveyed in the form of *sap* (192) to the leaves or other points of the surface of the plant, to be *elaborated* or *digested* (218), and afterwards redistributed over different parts of the plant for its support and growth.

(3) The **Leaves**, usually flat, green, and horizontal, are variously arranged on the stem and its branches. They *elaborate* or *digest* (218) the nutriment brought to them through the stem, absorb carbonic acid gas from the air, exhaling the superfluous oxygen, and returning the assimilated sap to the stem.

(4) The **Flowers**, usually placed at or towards the extremities of the branches. They are destined to form the future seed. When perfect and complete, they consist: 1st, of a *pistil* in the centre, consisting of one or more *carpels*, each containing the germ of one or more seeds; 2nd, of one or more *stamens* outside the pistil, whose action is necessary to *fertilize* the pistil or enable it to ripen its seed; 3rd, of a *perianth* or *floral envelope*, which usually encloses the stamens and pistil when young, and expands and exposes them to view when fully formed. This complete perianth is double: the outer one, called *Calyx*, is usually more green and leaf-like; the inner one, called the *Corolla*, more conspicuous, and variously coloured. It is the perianth, and especially the corolla, as the most showy part, that is generally called the flower in popular language.

(5) The **Fruit**, consisting of the pistil or its lower portion, which persists or remains attached to the plant after the remainder of the flower has withered and fallen off. It enlarges and alters more or less in shape or consistence, becomes a *seed-vessel*, enclosing the seed until it is ripe, when it either opens to discharge the seed or falls to the ground with the seed. In popular language the term *fruit* is often limited to such seed-vessels as are or look juicy and eatable. Botanists give that name to all seed-vessels.

16. The herbaceous perennial resembles the annual during the first year of its growth ; but it also forms (usually towards the close of the season), on its *stock* (the portion of the stem and root which does not die), one or more *buds*, either exposed, and then popularly called *eyes*, or concealed among leaves. These buds, called *leaf-buds*, to distinguish them from *flower-buds* or unopened flowers, are future branches as yet undeveloped ; they remain dormant through the winter, and the following spring grow out into new stems bearing leaves and flowers like those of the preceding year, whilst the lower part of the stock emits fresh roots to replace those which had perished at the same time as the stems.

17. Shrubs and trees form similar leaf-buds either at the extremity of their branches, or along the branches of the year. In the latter case these buds are usually *axillary*, that is, they appear in the *axil* of each leaf, *i. e.* in the angle formed by the leaf and the branch. When they appear at any other part of the plant they are called *adventitious*. If these buds by producing roots (19) become distinct plants before separating from the parent, or if adventitious leaf-buds are produced in the place of flowers or seeds, the plant is said to be *viviparous* or *proliferous*.

§ 2. The Root.

18. **Roots** ordinarily produce neither buds, leaves, nor flowers. Their branches, called *fibres* when slender and long, proceed irregularly from any part of their surface.

19. Although roots proceed usually from the base of the stem or stock, they may also be produced from the base of any bud, especially if the bud lie along the ground, or is otherwise placed by nature or art in circumstances favourable for their development, or indeed occasionally from almost any part of the plant. They are then often distinguished as *adventitious*, but this term is by some applied to all roots which are not in prolongation of the original radicle.

20. **Roots** are

fibrous, when they consist chiefly of slender fibres.

tuberous, when either the main root or its branches are thickened into one or more short fleshy or woody masses called *tubers* (25).

taproots, when the main root descends perpendicularly into the earth, emitting only very small fibrous branches.

21. The stock of a herbaceous perennial, or the lower part of the stem of an annual or perennial, or the lowest branches of a plant, are sometimes underground and assume the appearance of a root. They then take the name of *rhizome*. The rhizome may always be distinguished from the true root by the presence or production of one or more buds, or leaves, or scales.

§ 3. The Stock.

22. The **Stock** of a herbaceous perennial, in its most complete state, includes a small portion of the summits of the previous year's roots, as well as of the base of the previous year's stems. Such stocks will increase yearly, so as at length to form dense tufts. They will often preserve through the winter a few leaves, amongst which are placed the buds which grow out into stems the following year, whilst the underside of the stock emits new roots from or amongst the remains of the old ones. These perennial stocks only differ from the permanent base of an undershrub in the shortness of the perennial part of the stems and in their texture usually less woody.

23. In some perennials, however, the stock consists merely of a branch, which proceeds in autumn from the base of the stem either aboveground or underground, and produces one or more buds. This branch, or a portion of it, alone survives the winter. In the following year its buds produce the new

stem and roots, whilst the rest of the plant, even the branch on which these buds were formed, has died away. These *annual stocks*, called sometimes *hybernacula*, *offsets*, or *stolons*, keep up the communication between the annual stem and root of one year and those of the following year, thus forming altogether a perennial plant.

24. The stock, whether annual or perennial, is often entirely underground or rootlike. This is the *rootstock*, to which some botanists limit the meaning of the term *rhizome*. When the stock is entirely root-like, it is popularly called the *crown* of the root.

25. The term *tuber* is applied to a short, thick, more or less succulent rootstock or rhizome, as well as to a root of that shape (20), although some botanists propose to restrict its meaning to the one or to the other. An *Orchis* tuber, called by some a *knob*, is an annual tuberous rootstock with one bud at the top. A potato is an annual tuberous rootstock with several buds.

26. A *bulb* is a stock of a shape approaching to globular, usually rather conical above and flattened underneath, in which the bud or buds are concealed, or nearly so, under *scales*. These scales are the more or less thickened bases of the decayed leaves of the preceding year, or of the undeveloped leaves of the future year, or of both. Bulbs are annual or perennial, usually underground or close to the ground, but occasionally buds in the axils of the upper leaves become transformed into bulbs. Bulbs are said to be *scaly* when their scales are thick and loosely imbricated, *tunicated* when the scales are thinner, broader, and closely rolled round each other in concentric layers.

27. A *corm* is a tuberous rootstock, usually annual, shaped like a bulb, but in which the bud or buds are not covered by scales, or of which the scales are very thin and membranous.

§ 4. The Stem.

28. Stems are

erect, when they ascend perpendicularly from the root or stock; *twiggy* or *virgate*, when at the same time they are slender, stiff, and scarcely branched.

decumbent or *ascending*, when they spread horizontally, or nearly so, at the base, and then turn upwards and become erect.

procumbent, when they spread along the ground the whole or the greater portion of their length; *diffuse*, when at the same time very much and rather loosely branched.

prostrate, when they lie still closer to the ground.

creeping, when they emit roots at their nodes. This term is also frequently applied to any rhizomes or roots which spread horizontally.

tufted or *cæspitose*, when very short, close, and many together from the same stock.

29. Weak climbing stems are said to *twine*, when they support themselves by winding spirally round any object; such stems are also called *voluble*. When they simply climb without twining, they support themselves by their leaves, or by special clasping organs called *tendrils* (169), or sometimes, like the Ivy, by small root-like excrescences.

30. *Suckers* are young plants formed at the end of creeping, underground rootstocks. *Scions*, *runners*, and *stolons*, or *stoles*, are names given to young plants formed at the end or at the nodes (31) of branches or stocks creeping wholly or partially aboveground, or sometimes to the creeping stocks themselves.

31. A *node* is a point of the stem or its branches at which one or more leaves, branches, or leaf-buds (16) are given off. An *internode* is the portion of the stem comprised between two nodes.

32. **Branches** or **leaves** are

opposite, when two proceed from the same node on opposite sides of the stem.

whorled or *verticillate* (in a *whorl* or *verticil*), when several proceed from the same node, arranged regularly round the stem; *geminate*, *ternate*, *fascicled*, or *fasciculate* when two, three, or more proceed from the same node on the same side of the stem. A tuft of fasciculate leaves is usually in fact an axillary leafy branch, so short that the leaves appear to proceed all from the same point.

alternate, when one only proceeds from each node, one on one side and the next above or below on the opposite side of the stem.

decussate, when opposite, but each pair placed at right-angles to the next pair above or below it; *distichous*, when regularly arranged one above another in two opposite rows, one on each side of the stem; *tristichous*, when in three rows, etc. (92).

scattered, when irregularly arranged round the stem; frequently, however, botanists apply the term *alternate* to all branches or leaves that are neither opposite nor whorled.

second, when all start from or are turned to one side of the stem.

33. **Branches** are *dichotomous*, when several times forked, the two branches of each fork being nearly equal; *trichotomous*, when there are three nearly equal branches at each division instead of two; but when the middle branch is evidently the principal one, the stem is usually said to have two opposite branches; *umbellate*, when divided in the same manner into several nearly equal branches proceeding from the same point. If however the central branch is larger than the two or more lateral ones, the stem is said to have opposite or whorled branches, as the case may be.

34. A *culm* is a name sometimes given to the stem of Grasses, Sedges, and some other Monocotyledonous plants.

§ 5. *The Leaves.*

35. The ordinary or perfect **Leaf** consists of a flat *blade* or *lamina*, usually green, and more or less horizontal, attached to the stem by a stalk called a *foot-stalk* or *petiole*. When the form or dimensions of a leaf are spoken of, it is generally the blade that is meant, without the petiole or stalk.

36. The end by which a leaf, a part of the flower, a seed, or any other organ, is attached to the stem or other organ, is called its *base*, the opposite end is its *apex* or *summit*, excepting sometimes in the case of anther-cells (115).

37. **Leaves** are

sessile, when the blade rests on the stem without the intervention of a petiole.

amplexicaul or *stem-clasping*, when the sessile base of the blade clasps the stem horizontally.

perfoliate, when the base of the blade not only clasps the stem, but closes round it on the opposite side, so that the stem appears to pierce through the blade.

decurrent, when the edges of the leaf are continued down the stem so as to form raised lines or narrow appendages, called *wings*.

sheathing, when the base of the blade, or of the more or less expanded petiole, forms a vertical sheath round the stem for some distance above the node.

38. Leaves and flowers are called *radical*, when inserted on a rhizome or stock, or so close to the base of the stem as to appear to proceed from the root, rhizome, or stock; *cauline*, when inserted on a distinct stem. Radical leaves are *rosulate* when they spread in a circle on the ground.

39. **Leaves** are

simple and *entire*, when the blade consists of a single piece, with the margin nowhere indented, *simple* being used in opposition to *compound*, *entire* in opposition to *dentate*, *lobed*, or *divided*.

ciliate, when bordered with thick hairs or fine hair-like teeth.

dentate or *toothed*, when the margin is only cut a little way in, into what have been compared to teeth. Such leaves are *serrate*, when the teeth are regular and pointed like the teeth of a saw; *crenate*, when regular and blunt or rounded (compared to the battlements of a tower); *serrulate*, and *crenulate*, when the serratures or crenatures are small; *sinuate*, when the teeth are broad, not deep, and irregular (compared to bays of the coast); *wavy* or *undulate*, when the edges are not flat, but bent up and down (compared to the waves of the sea).

lobed or *cleft*, when more deeply indented or divided, but so that the incisions do not reach the midrib or petiole. The portions thus divided take the name of *lobes*. When the lobes are narrow and very irregular, the leaves are said to be *lacinate*. The spaces between the teeth or lobes are called *sinuses*.

divided or *dissected*, when the incisions reach the midrib, or petiole, but the parts so divided off, called *segments*, do not separate from the petiole, even when the leaf falls, without tearing.

compound, when divided to the midrib or petiole, and the parts so divided off, called *leaflets*, separate, at least at the fall of the leaf, from the petiole, as the whole leaf does from the stem, without tearing. The common stalk upon which the leaflets are inserted is called the *common petiole* or the *rhachis*; the separate stalk of each leaflet is a *petiolule*.

40. Leaves are more or less marked by *veins*, which, starting from the stalk, diverge or branch as the blade widens, and spread all over it more or less visibly. The principal ones, when prominent, are often called *ribs* or *nerves*, the smaller branches only then retaining the name of *veins*, or the latter are termed *veinlets*. The smaller veins are often connected together like the meshes of a net, they are then said to *anastomose*, and the leaf is said to be *reticulate* or *net-veined*. When one principal vein runs direct from the stalk towards the summit of the leaf, it is called the *midrib*. When several start from the stalk, diverge slightly without branching, and converge again towards the summit, they are said to be *parallel*, although not mathematically so. When 3 or 5 or more ribs or nerves diverge from the *base*, the leaf is said to be *3-nerved*, *5-nerved*, etc., but if the lateral ones diverge from the midrib a little above the base, the leaf is *triplinerved*, *quintuplinerved*, etc. The arrangement of the veins of a leaf is called their *venation*.

41. The **Leaflets, Segments, Lobes, or Veins** of leaves are

pinnate (feathered), when there are several succeeding each other on each side of the midrib or petiole, compared to the branches of a feather. A pinnately lobed or divided leaf is called *lyrate* when the terminal lobe or segment is much larger and broader than the lateral ones, compared, by a stretch of imagination, to a lyre; *runcinate*, when the lateral lobes are curved backwards towards the base of the leaf; *pectinate*, when the lateral lobes are numerous, narrow, and regular, like the teeth of a comb.

palmate or *digitate*, when several diverge from the same point, compared to the fingers of the hand.

ternate, when three only start from the same point, in which case the distinction between the palmate and pinnate arrangement often ceases, or can only be determined by analogy with allied plants. A leaf with ternate lobes is called *trifid*. A leaf with three leaflets is sometimes improperly called a ternate leaf: it is the leaflets that are ternate; the whole leaf is *trifoliate*. Ternate leaves are leaves growing three together.

pedate, when the division is at first ternate, but the two outer branches

are forked, the outer ones of each fork again forked, and so on, and all the branches are near together at the base, compared vaguely to the foot of a bird.

42. Leaves with pinnate, palmate, pedate, etc., leaflets, are usually for shortness called *pinnate*, *palmate*, *pedate*, etc., *leaves*. If they are so cut into segments only, they are usually said to be *pinnatisect*, *palmatisect*, *pedatisect*, etc., although the distinction between segments and leaflets is often unheeded in descriptions, and cannot indeed always be ascertained. If the leaves are so cut only into lobes, they are said to be *pinnatifid*, *palmatifid*, *pedatifid*, etc.

43. The teeth, lobes, segments, or leaflets, may be again toothed, lobed, divided, or compounded. Some leaves are even three or more times divided or compounded. In the latter case they are termed *decompound*. When twice or thrice pinnate (*bipinnate* or *tripinnate*), each primary or secondary division, with the leaflets it comprises, is called a *pinna*. When the pinna of a leaf or the leaflets of a pinna are in pairs, without an odd terminal pinna or leaflet, the leaf or pinna so divided is said to be *abruptly pinnate*; if there is an odd terminal pinna or leaflet, the leaf or pinna is *unequally pinnate* (*imparipinnatum*).

44. The number of leaves or their parts is expressed adjectively by the following numerals, derived from the Latin:—

uni-, bi-, tri-, quadri-, quinque-, sex-, septem-, octo-, novem-, decem-, multi-
1-, 2-, 3-, 4-, 5-, 6-, 7-, 8-, 9-, 10-, *many*-

prefixed to a termination, indicating the particular kind of part referred to. Thus—

undentate, *bidentate*, *multidentate*, mean one-toothed, two-toothed, many-toothed, etc.

bifid, *trifid*, *multifid*, mean two-lobed, three-lobed, many-lobed, etc.

unifoliolate, *bifoliolate*, *multifoliolate*, mean having one leaflet, two leaflets, many leaflets, etc.

unifoliate, *bifoliate*, *multifoliate*, mean having one leaf, two leaves, many leaves, etc.

biternate and *triternate*, mean twice or thrice ternately divided.

unijugate, *bijugate*, *multijugate*, etc., *pinnæ* or leaflets, mean that they are in one, two, many, etc., pairs (*juga*).

45. **Leaves** or their parts, when **flat**, or any other flat organs in plants, are

linear, when long and narrow, at least four or five times as long as broad, falsely compared to a mathematical line, for a linear leaf has always a perceptible breadth.

lanceolate, when about three or more times as long as broad, broadest below the middle, and tapering towards the summit, compared to the head of a lance.

cuneate, when broadest above the middle, and tapering towards the base, compared to a wedge with the point downwards; when very broadly cuneate and rounded at the top, it is often called *flabelliform* or *fan-shaped*.

spathulate, when the broad part near the top is short, and the narrow tapering part long, compared to a spatula or flat ladle.

ovate, when scarcely twice as long as broad, and rather broader below the middle, compared to the longitudinal section of an egg; *obovate* is the same form, with the broadest part above the middle.

orbicular, *oval*, *oblong*, *elliptical*, *rhomboidal*, etc., when compared to the corresponding mathematical figures.

transversely oblong, or *oblate*, when conspicuously broader than long.

falcate, when curved like the blade of a scythe.

46. Intermediate forms between any two of the above are expressed by combining two terms. Thus, a *linear-lanceolate* leaf is long and narrow, yet broader

below the middle, and tapering to a point; a *linear-oblong* one is scarcely narrow enough to be called linear, yet too narrow to be strictly oblong, and does not conspicuously taper either towards the summit or towards the base.

47. The *apex* or *summit* of a leaf is

acute or *pointed*, when it forms an acute angle or tapers to a point.

obtuse or *blunt*, when it forms a very obtuse angle, or more generally when it is more or less rounded at the top.

acuminate or *cuspidate*, when suddenly narrowed at the top, and then more or less prolonged into an *acumen* or *point*, which may be acute or obtuse, linear or tapering. Some botanists make a slight difference between the *acuminate* and *cuspidate* apex, the acumen being more distinct from the rest of the leaf in the latter case than in the former; but in general the two terms are used in the same sense, some preferring the one and some the other.

truncate, when the end is cut off square.

retuse, when very obtuse or truncate, and slightly indented.

emarginate or *notched*, when more decidedly indented at the end of the midrib; *obcordate*, if at the same time approaching the shape of a heart with its point downwards.

mucronate, when the midrib is produced beyond the apex in the form of a small point.

aristate, when the point is fine like a hair.

48. The base of the leaf is liable to the same variations of form as the apex, but the terms more commonly used are *tapering* or *narrowed* for acute and *acuminate*, *rounded* for obtuse, and *cordate* for emarginate. In all cases the petiole or point of attachment prevent any such absolute termination at the base as at the apex.

49. A leaf may be *cordate* at the base whatever be its length or breadth, or whatever the shape of the two lateral lobes, called *auricles* (or *little ears*), formed by the indenture or notch, but the term *cordiform* or *heart-shaped* leaf is restricted to an ovate and acute leaf, cordate at the base, with rounded auricles. The word auricles is more particularly used as applied to sessile and stem-clasping leaves.

50. If the auricles are pointed, the leaf is more particularly called *auriculate*; it is moreover said to be *sagittate*, when the points are directed downwards, compared to an arrow-head; *hastate*, when the points diverge horizontally, compared to a halbert.

51. A *reniform* leaf is broader than long, slightly but broadly cordate at the base, with rounded auricles, compared to a kidney.

52. In a *peltate* leaf, the stalk, instead of proceeding from the lower edge of the blade, is attached to the under surface, usually near the lower edge, but sometimes in the very centre of the blade. The peltate leaf has usually several principal nerves radiating from the point of attachment, being, in fact, a cordate leaf, with the auricles united.

53. All these modifications of division and form in the leaf pass so gradually one into the other that it is often difficult to say which term is the most applicable—whether the leaf be toothed or lobed, divided or compound, oblong or lanceolate, obtuse or acute, etc. The choice of the most apt expression will depend on the skill of the describer.

54. **Leaves**, when **solid**, **Stems**, **Fruits**, **Tubers**, and other parts of plants, when not flattened like ordinary leaves, are

setaceous or *capillary*, when very slender like bristles or hairs.

acicular, when very slender, but stiff and pointed like needles.

subulate, when rather thicker and firmer like awls.

linear, when at least four times as long as thick; *oblong*, when from about two to about four times as long as thick, the terms having the same sense as when applied to flat surfaces.

ovoid, when egg-shaped, with the broad end downwards, *obovoid*, if the broad end is upwards; these terms corresponding to *ovate* and *obovate* shapes in flat surfaces.

globular or *spherical*, when corresponding to *orbicular* in a flat surface. *Round* applies to both.

turbinate, when shaped like a top.

conical, when tapering upwards; *obconical*, when tapering downwards, if in both cases a transverse section shows a circle.

pyramidal, when tapering upwards; *obpyramidal*, when tapering downwards, if in both cases a transverse section shows a triangle or polygon.

fusiform, or spindle-shaped, when tapering at both ends; *cylindrical*, when not tapering at either end, if in both cases the transverse section shows a circle, or sometimes irrespective of the transverse shape.

terete, when the transverse section is not angular; *trigonus*, *triquetrous*, if the transverse section shows a triangle, irrespective in both cases of longitudinal form.

compressed, when more or less flattened laterally; *depressed*, when more or less flattened vertically, or at any rate at the top; *obcompressed* (in the achenes of *Compositæ*), when flattened from front to back.

articulate or *jointed*, if at any period of their growth (usually when fully formed and approaching their decay, or in the case of fruits when quite ripe) they separate, without tearing, into two or more pieces placed end to end. The joints where they separate are called *articulations*, each separate piece an *article*. The name of *joint* is, in common language, given both to the articulation and the article, but more especially to the former. Some modern botanists, however, propose to restrict it to the article, giving the name of *joining* to the articulation.

didymous, when slightly two-lobed, with rounded obtuse lobes.

moniliform, or beaded, when much contracted at regular intervals, but not separating spontaneously into articles.

55. In their consistence **Leaves** or other organs are

fleshy, when thick and soft; *succulent* is generally used in the same sense, but implies the presence of more juice.

coriaceous, when firm and dry, or very tough, of the consistence of leather.

membranous, when thin and not stiff.

scarious or *scariose*, when very thin, more or less transparent and not green, yet rather stiff.

56. The terms applied botanically to the consistence of solids are those in general use in common language.

57. The mode in which unexpanded leaves are disposed in the leaf-bud is called their *vernation* or *præfoliation*; it varies considerably, and technical terms have been proposed to express some of its varieties, but it has been hitherto rarely noticed in descriptive botany.

§ 6. Scales, Bracts, and Stipules.

58. **Scales** (*Squamæ*) are leaves very much reduced in size, usually sessile, seldom green or capable of performing the respiratory functions of leaves. In other words, they are organs resembling leaves in their position on the plant, but differing in size, colour, texture, and functions. They are most frequent on the stock of perennial plants, or at the base of annual branches, especially on the buds of future shoots, when they serve apparently to protect the dormant living germ from the rigour of winter. In the latter case they are usually short, broad, close together, and more or less *imbricated*, that is, overlapping each other like the tiles of a roof. It is this arrangement as well as their usual shape that has suggested the name of *scales*, borrowed from the scales of a fish. Im-

bricated scales, bracts, or leaves, are said to be *squarrose*, when their tips are pointed and very spreading or recurved.

59. Sometimes, however, most or all the leaves of the plant are reduced to small scales, in which case they do not appear to perform any particular function. The name of *scales* is also given to any small broad scale-like appendages or reduced organs, whether in the flower or any other part of the plant.

60. **Bracts** (*Bractee*) are the upper leaves of a plant in flower (either all those of the flowering branches, or only one or two immediately under the flower), when different from the stem-leaves in size, shape, colour or arrangement. They are generally much smaller and more sessile. They often partake of the colour of the flower, although they very frequently also retain the green colour of the leaves. When small, they are often called *scales*.

61. *Floral leaves* or *leafy bracts* are generally the lower bracts or the upper leaves at the base of the flowering branches, intermediate in size, shape, or arrangement, between the stem-leaves and the upper bracts.

62. *Bracteoles* are the one or two last bracts under each flower, when they differ materially in size, shape, or arrangement from the other bracts.

63. **Stipules** are leaf-like or scale-like appendages at the base of the leaf-stalk, or on the node of the stem. When present there are generally two, one on each side of the leaf, and they sometimes appear to protect the young leaf before it is developed. They are however exceedingly variable in size and appearance, sometimes exactly like the true leaves except that they have no buds in their axils, or looking like the leaflets of a compound leaf, sometimes apparently the only leaves of the plant; generally small and narrow, sometimes reduced to minute scales, spots, or scars, sometimes united into one opposite the leaf, or more or less united with, or *adnate* to the petiole, or quite detached from the leaf, and forming a ring or sheath round the stem in the axil of the leaf. In a great number of plants they are entirely wanting.

64. *Stipellæ*, or secondary stipules, are similar organs, sometimes found on compound leaves at the points where the leaflets are inserted.

65. When scales, bracts, or stipules, or almost any part of the plant besides leaves and flowers are stalked, they are said to be *stipitate*, from *stipes*, a stalk.

§ 7. Inflorescence and its Bracts.

66. The **Inflorescence** of a plant is the arrangement of the flowering branches, and of the flowers upon them. An *Inflorescence* is a flowering branch, or the flowering summit of a plant above the last stem-leaves, with its branches, bracts, and flowers.

67. A single flower, or an inflorescence, is *terminal* when at the summit of a stem or leafy branch, *axillary* when in the axil of a stem-leaf, *leaf-opposed* when opposite to a stem-leaf. The inflorescence of a plant is said to be *terminal* or *determinate* when the main stem and principal branches end in a flower or inflorescence (not in a leaf-bud), *axillary* or *indeterminate* when all the flowers or inflorescences are axillary, the stem or branches ending in leaf-buds.

68. A *Peduncle* is the stalk of a solitary flower, or of an inflorescence; that is to say, the portion of the flowering branch from the last stem-leaf to the flower, or to the first ramification of the inflorescence, or even up to its last ramifications; but the portion extending from the first to the last ramifications or the axis of inflorescence is often distinguished under the name of *rhachis*.

69. A *Scape* or *radical Peduncle* is a leafless peduncle proceeding from the stock, or from near the base of the stem, or apparently from the root itself.

70. A *pedicel* is the last branch of an inflorescence, supporting a single flower.

71. The branches of inflorescences may be, like those of stems, opposite,

alternate, etc. (32, 33), but very often their arrangement is different from that of the leafy branches of the same plant.

72. Inflorescence is

centrifugal, when the terminal flower opens first, and those on the lateral branches are successively developed.

centripetal, when the lowest flowers open first, and the main stem continues to elongate, developing fresh flowers.

73. Determinate inflorescence is usually centrifugal. Indeterminate inflorescence is always centripetal. Both inflorescences may be combined on one plant, for it often happens that the main branches of an inflorescence are centripetal, whilst the flowers on the lateral branches are centrifugal : or *vice versâ*

74. An Inflorescence is

a *Spike*, or *spicate*, when the flowers are sessile along a simple undivided axis or rhachis.

a *Raceme*, or *racenose*, when the flowers are borne on pedicels along a single undivided axis or rhachis.

a *Panicle*, or *paniculate*, when the axis is divided into branches bearing two or more flowers.

a *Head*, or *capitate*, when several sessile or nearly sessile flowers are collected into a compact head-like cluster. The short, flat, convex or conical axis on which the flowers are seated, is called the *receptacle*, a term also used for the torus of a single flower (135). The very compact flower-heads of *Compositæ* are often termed *compound flowers*.

an *Umbel*, or *umbellate*, when several branches or pedicels appear to start from the same point and are nearly of the same length. It differs from the head, like the raceme from the spike, in that the flowers are not sessile. An umbel is said to be *simple*, when each of its branches or *rays* bears a single flower ; *compound*, when each ray bears a *partial umbel* or *umbellule*.

a *Corymb*, or *corymbose*, when the branches and pedicels, although starting from different points, all attain the same level, the lower ones being much longer than the upper. It is a flat-topped or *fastigiate* panicle.

a *Cyme*, or *cymose*, when branched and centrifugal. It is a centrifugal panicle, and is often corymbose. The central flower opens first. The lateral branches successively developed are usually forked or opposite (dichotomous or trichotomous), but sometimes after the first forking the branches are no longer divided, but produce a succession of pedicels on their upper side forming apparently unilateral centripetal racemes ; whereas if attentively examined, it will be found that each pedicel is at first terminal, but becomes lateral by the development of one outer branch only, immediately under the pedicel. Such branches, when in bud, are generally rolled back at the top, like the tail of a scorpion, and are thence called *scorpioid*.

a *Thyrus*, or *thyrsoid*, when cymes, usually opposite, are arranged in a narrow pyramidal panicle.

75. There are numerous cases where inflorescences are intermediate between some two of the above, and are called by different botanists by one or the other name, according as they are guided by apparent or by theoretical similarity. A spike-like panicle, where the axis is divided into very short branches forming a cylindrical compact inflorescence, is called sometimes a spike, sometimes a panicle. If the flowers are in distinct clusters along a simple axis, the inflorescence is described as an *interrupted* spike or raceme, according as the flowers are nearly sessile or distinctly pedicellate ; although when closely examined the flowers will be found to be inserted not on the main axis, but on a very short branch, thus, strictly speaking, constituting a panicle.

76. The *catkins* (*amenta*) of *Amentaceæ*, the *spadices* of several *Monocotyledons*, the *ears* and *spikelets* of *Grasses* are forms of the spike.

77. Bracts are generally placed singly under each branch of the inflores-

cence, and under each pedicel ; bracteoles are usually two, one on each side, on the pedicel or close under the flower, or even upon the calyx itself ; but bracts are also frequently scattered along the branches without axillary pedicels ; and when the differences between the bracts and bracteoles are trifling or immaterial, they are usually all called bracts.

78. When three bracts appear to proceed from the same point, they will, on examination, be found to be really either one bract and two stipules, or one bract with two bracteoles in its axil. When two bracts appear to proceed from the same point, they will usually be found to be the stipules of an undeveloped bract, unless the branches of the inflorescence are opposite, when the bracts will of course be opposite also.

79. When several bracts are collected in a whorl, or are so close together as to appear whorled, or are closely imbricated round the base of a head or umbel, they are collectively called an *Involucre*. The bracts composing an involucre are described under the names of *leaves*, *leaflets*, *bracts* or *scales*, according to their appearance. *Phyllaries* is a useless term, occasionally applied to the bracts or scales of the involucre of *Compositæ*. An *Involucel* is the involucre of a partial umbel.

80. When several very small bracts are placed round the base of a calyx or of an involucre, they have been termed a *calyculæ*, and the calyx or involucre said to be *calyculate*, but these terms are now falling into disuse, as conveying a false impression.

81. A *Spatha* is a bract or floral leaf enclosing the inflorescence of some Monocotyledons.

82. *Paleæ*, *Pales*, or *Chaff*, are the inner bracts or scales in *Compositæ*, *Gramineæ*, and some other plants, when of a thin yet stiff consistence, usually narrow and of a pale colour.

83. *Glumes* are the bracts enclosing the flowers of *Cyperaceæ* and *Gramineæ*.

§ 8. The Flower in General.

84. A **complete Flower** (15) is one in which the calyx, corolla, stamens, and pistils are all present ; a *perfect* flower, one in which all these organs, or such of them as are present, are capable of performing their several functions. Therefore, properly speaking, an *incomplete* flower is one in which any one or more of these organs is wanting ; and an *imperfect* flower, one in which any one or more of these organs is so altered as to be incapable of properly performing its functions. These imperfect organs are said to be *abortive* if much reduced in size or efficiency, *rudimentary* if so much so as to be scarcely perceptible. But, in many works, the term *incomplete* is specially applied to those flowers in which the perianth is simple or wanting, and *imperfect* to those in which either the stamens or pistil are imperfect or wanting.

85. A **Flower** is

dichlamydeous, when the perianth is double, both calyx and corolla being present and distinct.

monochlamydeous, when the perianth is single, whether by the union of the calyx and corolla, or the deficiency of either.

asepalous, when there is no calyx.

apetalous, when there is no corolla.

naked, when there is no perianth at all.

hermaphrodite or *bisexual*, when both stamens and pistil are present and perfect.

male or *staminate*, when there are one or more stamens, but either no pistil at all or an imperfect one.

female or *pistillate*, when there is a pistil, but either no stamens at all, or only imperfect ones.

neuter, when both stamens and pistil are imperfect or wanting.

barren or *sterile*, when from any cause it produces no seed.

fertile, when it does produce seed. In some works the terms *barren*, *fertile*, and *perfect* are also used respectively as synonyms of *male*, *female*, and *hermaphrodite*.

86. The flowers of a plant or species are said collectively to be *unisexual* or *diclinous* when the flowers are all either male or female.

monœcious, when the male and female flowers are distinct, but on the same plant.

dioecious, when the male and female flowers are on distinct plants.

polygamous, when there are male, female, and hermaphrodite flowers on the same or on distinct plants.

87. A head of flowers is *heterogamous* when male, female, hermaphrodite, and neuter flowers, or any two or three of them, are included in one head; *homogamous*, when all the flowers included in one head are alike in this respect. A spike or head of flowers is *androgynous* when male and female flowers are mixed in it. These terms are only used in the case of very few Natural Orders.

88. As the scales of buds are leaves undeveloped or reduced in size and altered in shape and consistence, and bracts are leaves likewise reduced in size, and occasionally altered in colour; so the parts of the flower are considered as leaves still further altered in shape, colour, and arrangement round the axis, and often more or less combined with each other. The details of this theory constitute the comparatively modern branch of botany called *Vegetable Metamorphosis*, or *Homology*, sometimes improperly termed *Morphology* (8).

89. To understand the arrangement of the floral parts, let us take a *complete* flower, in which moreover all the parts are *free* from each other, *definite* in number, *i. e.* always the same in the same species, and *symmetrical* or *isomerous*, *i. e.* when each whorl consists of the same number of parts.

90. Such a complete symmetrical flower consists usually of either four or five whorls of altered leaves (88), placed immediately one within the other.

The **Calyx** forms the outer whorl. Its parts are called *sepals*.

The **Corolla** forms the next whorl. Its parts, called *petals*, usually *alternate* with the sepals; that is to say, the centre of each petal is immediately over or within the interval between two sepals.

The **Stamens** form one or two whorls within the petals. If two, those of the outer whorl (the *outer stamens*) alternate with the petals, and are consequently opposite to, or over the centre of the sepals; those of the inner whorl (the *inner stamens*) alternate with the outer ones, and are therefore opposite to the petals. If there is only one whorl of stamens, they most frequently alternate with the petals; but sometimes they are opposite the petals and alternate with the sepals.

The **Pistil** forms the inner whorl; its carpels usually alternate with the inner row of stamens.

91. In an axillary or lateral flower the *upper* parts of each whorl (sepals, petals, stamens, or carpels) are those which are next to the main axis of the stems or branch, the *lower* parts those which are furthest from it; the intermediate ones are said to be *lateral*. The words *anterior* (front) and *posterior* (back) are often used for lower and upper respectively, but their meaning is sometimes reversed if the writer supposes himself in the centre of the flower instead of outside of it.

92. The number of parts in each whorl of a flower is expressed adjectively by the following numerals derived from the Greek:—

mono-, di-, tri-, tetra-, penta-, hexa-, hepta-, octo-, ennea-, deca-, etc., poly-
1-, 2-, 3-, 4-, 5-, 6-, 7-, 8-, 9-, 10-. many-

prefixed to a termination indicating the whorl referred to.

93. Thus, a **Flower** is *disepalous*, *trisepalous*, *tetrasepalous*, *polysepalous*, etc., according as there are 2, 3, 4, or many (or an indefinite number of) sepals.
dipetalous, *tripetalous*, *polypetalous*, etc., according as there are 2, 3, or many petals.
diandrous, *triandrous*, *polyandrous*, etc., according as there are 2, 3, or many stamens.
digynous, *trigynous*, *polygynous*, etc., according as there are 2, 3, or many carpels.

And generally (if symmetrical), *dimerous*, *trimerous*, *polymerous*, etc., according as they are 2, 3, or many (or an indefinite number of) parts to each whorl.

94. Flowers are *unsymmetrical* or *anisomerous*, strictly speaking, when any one of the whorls has a different number of parts from any other; but when the pistils alone are reduced in number, the flower is still frequently called symmetrical or isomerous, if the calyx, corolla, and staminal whorls have all the same number of parts.

95. Flowers are *irregular* when the parts of any one of the whorls are unequal in size, dissimilar in shape, or do not spread regularly round the axis at equal distances. It is however more especially irregularity of the corolla that is referred to in descriptions. A slight inequality in size or direction in the other whorls does not prevent the flower being classed as *regular*, if the corolla or perianth is conspicuous and regular.

§ 9. The Calyx and Corolla, or Perianth.

96. The **Calyx** (90) is usually green, and smaller than the corolla; sometimes very minute, rudimentary, or wanting, sometimes very indistinctly whorled, or not whorled at all, or in two whorls, or composed of a large number of sepals, of which the outer ones pass gradually into bracts, and the inner ones into petals.

97. The **Corolla** (90) is usually coloured, and of a more delicate texture than the calyx, and, in popular language, is often more specially meant by the *flower*. Its petals are more rarely in two whorls, or indefinite in number, and the whorl more rarely broken than in the case of the calyx, at least when the plant is in a natural state. *Double flowers* are in most cases an accidental deformity or monster in which the ordinary number of petals is multiplied by the conversion of stamens, sepals, or even carpels into petals, by the division of ordinary petals, or simply by the addition of supernumerary ones. Petals are also sometimes very small, rudimentary, or entirely deficient.

98. In very many cases, a so-called *simple perianth* (15) (of which the parts are usually called *leaves* or *segments*) is one in which the sepals and petals are similar in form and texture, and present apparently a single whorl. But if examined in the young bud, one-half of the parts will generally be found to be placed outside the other half, and there will frequently be some slight difference in texture, size, and colour, indicating to the close observer the presence of both calyx and corolla. Hence much discrepancy in descriptive works. Where one botanist describes a simple perianth of six segments, another will speak of a double perianth of three sepals and three petals.

99. The following terms and prefixes, expressive of the modifications of form and arrangement of the corolla and its petals, are equally applicable to the calyx and its sepals, and to the simple perianth and its segments.

100. The Corolla is said to be *monopetalous* when the petals are united, either entirely or at the base only, into a cup, tube, or ring; *polypetalous* when they are all free from the base. These expressions, established by a long usage, are not strictly correct, for *monopetalous* (consisting of a single petal) should

apply rather to a corolla really reduced to a single petal, which would then be on one side of the axis; and *polypetalous* is sometimes used more appropriately for a corolla with an indefinite number of petals. Some modern botanists have therefore proposed the term *gamopetalous* for the corolla with united petals, and *dialypetalous* for that with free petals; but the old established expressions are still the most generally used.

101. When the petals are partially united, the lower entire portion of the corolla is called the *tube*, whatever be its shape, and the free portions of the petals are called the *teeth*, *lobes*, or *segments* (39), according as they are short or long in proportion to the whole length of the corolla. When the tube is excessively short, the petals appear at first sight free, but their slight union at the base must be carefully attended to, being of importance in classification.

102. The **Æstivation** of a corolla is the arrangement of the petals, or of such portion of them as is free, in the unexpanded bud. It is

valvate, when they are strictly whorled in their whole length, their edges being placed against each other without overlapping. If the edges are much inflexed, the æstivation is at the same time *induplicate*; *involute*, if the margins are rolled inward; *reduplicate*, if the margins project outwards into salient angles; *revolute*, if the margins are rolled outwards; *plicate*, if the petals are folded in longitudinal plaits.

imbricate, when the whorl is more or less broken by some of the petals being outside the others, or by their overlapping each other at least at the top. Five-petaled imbricate corollas are *quincuncially* imbricate when one petal is outside, and an adjoining one wholly inside, the three others intermediate and overlapping on one side; *bilabiate*, when two adjoining ones are inside or outside the three others. Imbricate petals are described as *crumpled* (*corrugate*) when puckered irregularly in the bud.

twisted, *contorted*, or *convolute*, when each petal overlaps an adjoining one on one side, and is overlapped by the other adjoining one on the other side. Some botanists include the twisted æstivation in the general term *imbricate*; others carefully distinguish the one from the other.

103. In a few cases the overlapping is so slight that the three æstivations cannot easily be distinguished one from the other; in a few others the æstivation is variable, even in the same species, but, in general, it supplies a constant character in species, in genera, or even in natural Orders.

104. In general shape the **Corolla** is

tubular, when the whole or the greater part of it is in the form of a tube or cylinder.

campanulate, when approaching in some measure the shape of a cup or bell.

urceolate, when the tube is swollen or nearly globular, contracted at the top, and slightly expanded again in a narrow rim.

rotate or *stellate*, when the petals or lobes are spread out horizontally from the base, or nearly so, like a wheel or star.

hypocrateriform or *salver-shaped*, when the lower part is cylindrical and the upper portion expanded horizontally. In this case the name of *tube* is restricted to the cylindrical part, and the horizontal portion is called the *limb*, whether it be divided to the base or not. The orifice of the tube is called its *mouth* or *throat*.

infundibuliform, or *funnel-shaped*, when the tube is cylindrical at the base, but enlarged at the top into a more or less campanulate limb, of which the lobes often spread horizontally. In this case the campanulate part, up to the commencement of the lobes, is sometimes considered as a portion of the tube, sometimes as a portion of the limb, and by some botanists again described as independent of either, under the name of *throat* (*fauces*). Generally speaking, however, in campanulate, infundibuliform, or other corollas, where the lower

entire part passes gradually into the upper divided and more spreading part, the distinction between the *tube* and the *limb* is drawn either at the point where the lobes separate, or at the part where the corolla first expands, according to which is the most marked.

105. Irregular corollas have received various names according to the more familiar forms they have been compared to. Some of the most important are the

bilabiate, or *two-lipped* corolla, when, in a four- or five-lobed corolla, the two or three upper lobes stand obviously apart, like an *upper lip*, from the two or three lower ones or *under lip*. In *Orchideæ* and some other families the name of lip, or *labellum*, is given to one of the divisions or lobes of the perianth.

personate, when two-lipped, and the orifice of the tube closed by a projection from the base of the upper or lower lip, called a *palate*.

ringent, when very strongly two-lipped, and the orifice of the tube very open.

spurred, when the tube or the lower part of a petal has a conical hollow projection, compared to the spur of a cock; *saccate*, when the spur is short and round like a little bag; *gibbous*, when projecting at any part into a slight swelling.

resupinate or *reversed*, when a lip, spur, etc., which in allied species is usually lowest, lies uppermost, and *vice versa*.

106. The above terms are mostly applied to the forms of monopetalous corollas, but several are also applicable to those of polypetalous ones. Terms descriptive of the special forms of corolla in certain Natural Orders, will be explained under those Orders respectively.

107. Most of the terms used for describing the forms of leaves (39, 45) are also applicable to those of individual petals; but the flat expanded portion of a petal, corresponding to the blade of the leaf, is called its *lamina*, and the stalk, corresponding to the petiole, its *claw* (*unguis*). The stalked petal is said to be *unguiculate*.

§ 10. *The Stamens.*

108. Although in a few cases the outer stamens may gradually pass into petals, yet, in general, **Stamens** are very different in shape and aspect from leaves, sepals, or petals. It is only in a theoretical point of view (not the less important in the study of the physiological economy of the plant) that they can be called altered leaves.

109. This usual form is a stalk, called the *filament*, bearing at the top an *anther* divided into two pouches or *cells*. These anther-cells are filled with *pollen*, consisting of minute grains, usually forming a yellow dust, which, when the flower expands, is scattered from an opening in each cell. When the two cells are not closely contiguous, the portion of the anther that unites them is called the *connectivum*.

110. The filament is often wanting, and the anther sessile, yet still the stamen is perfect; but if the anther, which is the essential part of the stamen, is wanting, or does not contain pollen, the stamen is imperfect, and is then said to be *barren* or *sterile* (without pollen), *abortive*, or *rudimentary* (84), according to the degree to which the imperfection is carried. Imperfect stamens are often called *staminodia*.

111. In unsymmetrical flowers, the stamens of each whorl are sometimes reduced in number below that of the petals, even to a single one, and in several Natural Orders they are multiplied indefinitely.

112. The terms *monandrous* and *polyandrous* are restricted to flowers which have really but one stamen, or an indefinite number respectively. Where several stamens are united into one, the flower is said to be *syndrous*.

113. Stamens are

monadelphous, when united by their filaments into one cluster. This cluster either forms a tube round the pistil, or, if the pistil is wanting, occupies the centre of the flower.

diadelphous, when so united into two clusters. The term is more especially applied to certain *Leguminosæ*, in which nine stamens are united in a tube slit open on the upper side, and a tenth, placed in the slit, is free. In some other plants the stamens are equally distributed in the two clusters.

triadelphous, *pentadelphous*, *polyadelphous*, when so united into three, five, or many clusters.

syngenesious, when united by their anthers in a ring round the pistil, the filaments usually remaining free.

didynamous, when (usually in a bilabiate flower) there are four stamens in two pairs, those of one pair longer than those of the other.

tetradynamous, when (in *Cruciferae*) there are six, four of them longer than the two others.

exserted, when longer than the corolla, or even when longer than its tube, if the limb be very spreading.

114. An Anther (109) is

adnate, when continuous with the filament, the anther-cells appearing to lie their whole length along the upper part of the filament.

innate, when firmly attached by their base to the filament. This is an adnate anther when rather more distinct from the filament.

versatile, when attached by their back to the very point of the filament, so as to swing loosely.

115. Anther-cells may be *parallel* or *diverging* at a less or greater angle; or *divaricate*, when placed end to end so as to form one straight line. The end of each anther-cell placed nearest to the other cell is generally called its *apex* or *summit*, and the other end its *base* (36); but some botanists reverse the sense of these terms.

116. Anthers have often, on their connectivum or cells, appendages termed *bristles* (setæ), *spurs*, *crests*, *points*, *glands*, etc., according to their appearance.

117. Anthers have occasionally only one cell: this may take place either by the disappearance of the partition between two closely contiguous cells, when these cells are said to be *confluent*; or by the abortion or total deficiency of one of the cells, when the anther is said to be *dimidiate*.

118. Anthers will open or *dehisce* to let out the pollen, like capsules, in *valves*, *pores*, or *slits*. Their dehiscence is *introrse*, when the opening faces the pistil; *extrorse*, when it is towards the circumference of the flower.

119. Pollen (109) is not always in the form of dust. It is sometimes collected in each cell into one or two little wax-like masses. Special terms used in describing these masses or other modifications of the pollen will be explained under the Orders where they occur.

§ 11. *The Pistil.*

120. The carpels (91) of the **Pistil**, although they may occasionally assume, rather more than stamens, the appearance and colour of leaves, are still more different in shape and structure. They are usually sessile; if stalked, their stalk is called a *podocarp*. This stalk, upon which each separate carpel is supported above the receptacle, must not be confounded with the *gynobasis* (143), upon which the whole pistil is sometimes raised.

121. Each carpel consists of three parts:

1. the **Ovary**, or enlarged base, which includes one or more cavities or *cells*, containing one or more small bodies called *ovules*. These are the earliest condition of the future seeds.

2. the **Style**, proceeding from the summit of the ovary, and supporting—

3. the **Stigma**, which is sometimes a point (or *punctiform* stigma) or small head (a *capitate* stigma) at the top of the style or ovary, sometimes a portion of its surface more or less lateral and variously shaped, distinguished by a looser texture, and covered with minute protuberances called *papillæ*.

122. The style is often wanting, and the stigma is then sessile on the ovary, but in the perfect pistil there is always at least one ovule in the ovary, and some portion of stigmatic surface. Without these the pistil is imperfect, and said to be *barren* (not setting seed), *abortive*, or *rudimentary* (81), according to the degree of imperfection.

123. The ovary being the essential part of the pistil, most of the terms relating to the number, arrangement, etc., of the carpels, apply specially to their ovaries. In some works each separate carpel is called a pistil, all those of a flower constituting together the *gynæcium*; but this term is in little use, and the word *pistil* is more generally applied in a collective sense. When the ovaries are at all united, they are commonly termed collectively a compound ovary.

124. The number of carpels or ovaries in a flower is frequently reduced below that of the parts of the other floral whorls, even in flowers otherwise symmetrical. In a very few genera, however, the ovaries are more numerous than the petals, or indefinite. They are in that case either arranged in a single whorl, or form a head or spike in the centre of the flower.

125. The terms *monogynous*, *digynous*, *polygynous*, etc. (with a pistil of one, two, or more parts), are vaguely used, applying sometimes to the whole pistil, sometimes to the ovaries alone, or to the styles or stigmas only. Where a more precise nomenclature is adopted, the flower is

monocarpellary, when the pistil consists of a single simple carpel.

bi-, tri-, etc., to *poly-carpellary*, when the pistil consists of two, three, or an indefinite number of carpels, whether separate or united.

syncarpous, when the carpels or their ovaries are more or less united into one compound ovary.

apocarpous, when the carpels or ovaries are all free and distinct.

126. A *compound* ovary is

unilocular or *one-celled*, when there are no partitions between the ovules, or when these partitions do not meet in the centre so as to divide the cavity into several cells.

plurilocular or *several-celled*, when completely divided into two or more cells by partitions called *dissepiments* (*septa*), usually vertical and radiating from the centre or axis of the ovary to its circumference.

bi-, tri-, etc., to *multi-locular*, according to the number of these cells, two, three, etc., or many.

127. In general the number of cells or of dissepiments, complete or partial, or of rows of ovules, corresponds with that of the carpels, of which the pistil is composed. But sometimes each carpel is divided completely or partially into two cells, or has two rows of ovules, so that the number of carpels appears double what it really is. Sometimes again the carpels are so completely combined and reduced as to form a single cell, with a single ovule, although it really consist of several carpels. But in these cases the ovary is usually described as it appears, as well as such as it is theoretically supposed to be.

128. In apocarpous pistils the styles are usually free, each bearing its own stigma. Very rarely the greater part of the styles, or the stigmas alone, are united, whilst the ovaries remain distinct.

129. Syncarpous flowers are said to have

several styles, when the styles are free from the base.

one style, with several branches, when the styles are connected at the base,

but separate below the point where the stigmas or stigmatic surfaces commence.

one simple style, with several stigmas, when united up to the point where the stigmas or stigmatic surfaces commence, and then separating.

one simple style, with a branched, lobed, toothed, notched, or entire stigma (as the case may be), when the stigmas also are more or less united. In many works, however, this precise nomenclature is not strictly adhered to, and considerable confusion is often the result.

130. In general the number of styles, or branches of the style or stigma, is the same as that of the carpels, but sometimes that number is doubled, especially in the stigmas, and sometimes the stigmas are dichotomously or pinnately branched, or *penicillate*, that is, divided into a tuft of hair-like branches. All these variations sometimes make it a difficult task to determine the number of carpels forming a compound ovary, but the point is of considerable importance in fixing the affinities of plants, and, by careful consideration, the real as well as the apparent number has now in most cases been agreed upon.

131. The *Placenta* is the part of the inside of the ovary to which the ovules are attached, sometimes a mere point or line on the inner surface, often more or less thickened or raised. *Placentation* is therefore the indication of the part of the ovary to which the ovules are attached.

132. *Placentas* are

axile, when the ovules are attached to the axis or centre, that is, in plurilocular ovaries, when they are attached to the inner angle of each cell; in unilocular simple ovaries, which have almost always an excentric style or stigma, when the ovules are attached to the side of the ovary nearest to the style; in unilocular compound ovaries, when the ovules are attached to a central protuberance, column, or axis rising up from the base of the cavity. If this column does not reach the top of the cavity, the placenta is said to be *free* and *central*.

parietal, when the ovules are attached to the inner surface of the cavity of a one-celled compound ovary. Parietal placentas are usually slightly thickened or raised lines, sometimes broad surfaces nearly covering the inner surface of the cavity, sometimes projecting far into the cavity, and constituting partial dissepiments, or even meeting in the centre, but without cohering there. In the latter case the distinction between the one-celled and the several-celled ovary sometimes almost disappears.

133. Each **Ovule** (121), when fully formed, usually consists of a central mass or *nucleus* enclosed in two bag-like *coats*, the outer one called *primine*, the inner one *secundine*. The *chalaza* is the point of the ovule at which the base of the nucleus is confluent with the coats. The *foramen* is a minute aperture in the coats over the *apex* of the nucleus.

134. **Ovules** are

orthotropous or *straight*, when the chalaza coincides with the base (36) of the ovule, and the foramen is at the opposite extremity, the axis of the ovule being straight.

campylotropous or *incurved*, when the chalaza still coinciding with the base of the ovule, the axis of the ovule is curved, bringing the foramen down more or less towards that base.

anatropous or *inverted*, when the chalaza is at the apex of the ovule, and the foramen next to its base, the axis remaining straight. In this, one of the most frequent forms of the ovule, the chalaza is connected with the base by a cord, called the *raphe*, adhering to one side of the ovule, and becoming more or less incorporated with its coats, as the ovule enlarges into a seed.

amphitropous or *half-inverted*, when the ovule being as it were attached laterally, the chalaza and foramen at opposite ends of its straight or curved axis are about equally distant from the base or point of attachment.

§ 12. *The Receptacle and Relative Attachment of the Floral Whorls.*

135. The **Receptacle** or *torus* is the extremity of the peduncle (above the calyx), upon which the corolla, stamens, and ovary are inserted. It is sometimes little more than a mere point or minute hemisphere, but it is often also more or less elongated, thickened, or otherwise enlarged. It must not be confounded with the receptacle of inflorescence (74).

136. A *Disk*, or *disc*, is a circular enlargement of the receptacle, usually in the form of a cup (*cupular*), of a flat disk or quoit, or of a cushion (*pulvinate*). It is either immediately at the base of the ovary within the stamens, or between the petals and stamens, or bears the petals or stamens or both on its margin, or is quite at the extremity of the receptacle, with the ovaries arranged in a ring round it or under it.

137. The disk may be *entire*, or *toothed* or *lobed*, or *divided* into a number of parts, usually equal to or twice that of the stamens or carpels. When the parts of the disk are quite separate and short, they are often called *glands*.

138. *Nectaries*, are either the disk, or small deformed petals, or abortive stamens, or appendages at the base of petals or stamens, or any small bodies within the flower which do not look like petals, stamens, or ovaries. They were formerly supposed to supply bees with their honey, and the term is frequently to be met with in the older Floras, but is now deservedly going out of use.

139. When the disk bears the petals and stamens, it is frequently adherent to, and apparently forms part of, the tube of the calyx, or it is adherent to and apparently forms part of, the ovary, or of both calyx-tube and ovary. Hence the three following important distinctions in the relative insertion of the floral whorls.

140. Petals, or as it is frequently expressed, flowers, are

hypogynous (*i.e.* under the ovary), when they or the disk that bears them are entirely free both from the calyx and ovary. The ovary is then described as *free* or *superior*, the calyx as *free* or *inferior*, the petals as being *inserted on the receptacle*.

perigynous (*i.e.* round the ovary), when the disk bearing the petals is quite free from the ovary, but is more or less combined with the base of the calyx-tube. The ovary is then still described as *free* or *superior*, even though the combined disk and calyx-tube may form a deep cup with the ovary lying in the bottom; the calyx is said to be *free* or *inferior*, and the petals are described as *inserted on the calyx*.

epigynous (*i.e.* upon the ovary), when the disk bearing the petals is combined both with the base of the calyx-tube and the outside base of the ovary; either closing over the ovary so as only to leave a passage for the style, or leaving more or less of the top of the ovary free, but always adhering to it above the level of the insertion of the lowest ovule (except in a very few cases where the ovules are absolutely suspended from the top of the cell). In epigynous flowers the ovary is described as *adherent* or *inferior*, the calyx as *adherent* or *superior*, the petals as *inserted on or above the ovary*. In some works, however, most epigynous flowers are included in the perigynous ones, and a very different meaning is given to the term *epigynous* (144), and there are a few cases where no positive distinction can be drawn between the epigynous and perigynous flowers, or again between the perigynous and hypogynous flowers.

141. When there are no petals, it is the insertion of the stamens that determines the difference between the hypogynous, perigynous, and epigynous flowers.

142. When there are both petals and stamens,

in hypogynous flowers, the petals and stamens are usually free from each other, but sometimes they are combined at the base. In that case, if the petals

are distinct from each other, and the stamens are monadelphous, the petals are often said to be *inserted on* or *combined with the staminal tube*; if the corolla is gamopetalous and the stamens distinct from each other, the latter are said to be *inserted in the tube of the corolla*.

in perigynous flowers, the stamens are usually inserted immediately within the petals, or alternating with them on the edge of the disk, but occasionally much lower down within the disk, or even on the unenlarged part of the receptacle.

in epigynous flowers, when the petals are distinct, the stamens are usually inserted as in perigynous flowers; when the corolla is gamopetalous, the stamens are either free and hypogynous, or combined at the base with (inserted in) the tube of the corolla.

143. When the receptacle is distinctly elongated below the ovary, it is often called a *gynobasis*, *gynophore*, or *stalk of the ovary*. If the elongation takes place below the stamens or below the petals, these stamens or petals are then said to be *inserted on the stalk of the ovary*, and are occasionally, but falsely, described as *epigynous*. Really epigynous stamens (*i. e.* when the filaments are combined with the ovary) are very rare, unless the rest of the flower is epigynous.

144. An *epigynous disk* is a name given either to the thickened summit of the ovary in epigynous flowers, or very rarely to a real disk or enlargement of the receptacle closing over the ovary.

145. In the relative position of any two or more parts of the flower, whether in the same or in different whorls, they are

connivent, when nearer together at the summit than at the base.

divergent, when further apart at the summit than at the base.

coherent, when united together, but so slightly that they can be separated with little or no laceration; and one of the two coherent parts (usually the smallest or least important) is said to be *adherent* to the other. Grammatically speaking, these two terms convey nearly the same meaning, but require a different form of phrase; practically however it has been found more convenient to restrict *cohesion* to the union of parts of the same whorl, and *adhesion* to the union of parts of different whorls.

connate, when so closely united that they cannot be separated without laceration. Each of the two connate parts, and especially that one which is considered the smaller or of the least importance, is said to be *adnate* to the other.

free, when neither coherent nor connate.

distinct is also used in the same sense, but is also applied to parts distinctly visible or distinctly limited.

§ 13. The Fruit.

146. The **Fruit** (15) consists of the ovary and whatever other parts of the flower are *persistent* (*i. e.* persist at the time the seed is ripe), usually enlarged, and more or less altered in shape and consistence. It encloses or covers the seed or seeds till the period of maturity, when it either opens for the seed to escape, or falls to the ground with the seed. When stalked, its stalk has been termed a *carpopophore*.

147. Fruits are, in elementary works, said to be *simple* when the result of a single flower, *compound* when they proceed from several flowers closely packed or combined in a head. But as a fruit resulting from a single flower, with several distinct carpels, is compound in the sense in which that term is applied to the ovary, the terms *single* and *aggregate*, proposed for the fruit resulting from one or several flowers, may be more appropriately adopted. In descriptive botany a fruit is always supposed to result from a single flower unless the contrary be stated. It may, like the pistil, be syncarpous or apocarpous (125);

and, as in many cases carpels united in the flower may become separate as they ripen, an apocarpous fruit may result from a syncarpous pistil.

148. The involucre or bracts often persist and form part of aggregate fruits, but very seldom so in single ones.

149. The receptacle becomes occasionally enlarged and succulent; if when ripe it falls off with the fruit, it is considered as forming part of it.

150. The adherent part of the calyx of epigynous flowers always persists and forms part of the fruit; the free part of the calyx of epigynous flowers or the calyx of perigynous flowers, either persists entirely at the top of or round the fruit, or the lobes alone fall off, or the lobes fall off with whatever part of the calyx is above the insertion of the petals, or the whole of what is free from the ovary falls off, including the disk bearing the petals. The calyx of hypogynous flowers usually falls off entirely or persists entirely. In general a calyx is called *deciduous* if any part falls off. When it persists it is either enlarged round or under the fruit, or it withers and dries up.

151. The corolla usually falls off entirely; when it persists it is usually withered and dry (*marcescent*), or very seldom enlarges round the fruit.

152. The stamens either fall off, or more or less of their filaments persists, usually withered and dry.

153. The style sometimes falls off or dries up and disappears; sometimes persists, forming a point to the fruit, or becomes enlarged into a wing or other appendage to the fruit.

154. The *Pericarp* is the portion of the fruit formed of the ovary, and whatever adheres to it exclusive of and outside of the seed or seeds, exclusive also of the persistent receptacle, or of whatever portion of the calyx persists round the ovary without adhering to it.

155. Fruits have often external appendages called *wings* (*alæ*), *beaks*, *crests*, *awns*, etc., according to their appearance. They are either formed by persistent parts of the flower more or less altered, or grow out of the ovary or the persistent part of the calyx. If the appendage be a ring of hairs or scales round the top of the fruit, it is called a *pappus*.

156. Fruits are generally divided into *succulent* (including *fleshy*, *pulpy*, and *juicy* fruits) and *dry*. They are *dehiscent* when they open at maturity to let out the seeds, *indehiscent* when they do not open spontaneously but fall off with the seeds. Succulent fruits are usually indehiscent.

157. The principal kinds of succulent fruits are the *Berry*, in which the whole substance of the pericarp is fleshy or pulpy, with the exception of the outer skin or rind, called the *Epicarp*. The seeds themselves are usually immersed in the pulp; but in some berries, the seeds are separated from the pulp by the walls of the cavity or cells of the ovary, which form as it were a thin inner skin or rind, called the *Endocarp*.

the *Drupe*, in which the pericarp, when ripe, consists of two distinct portions, an outer succulent one called the *Sarcocarp* (covered like the berry by a skin or epicarp), and an inner dry endocarp called the *Putamen*, which is either *cartilaginous* (of the consistence of parchment) or hard and woody. In the latter case it is commonly called a *stone*, and the drupe a *stone-fruit*.

158. The principal kinds of dry fruits are

the *Capsule* or *Pod*,* which is dehiscent. When ripe the pericarp usually splits longitudinally into as many or twice as many pieces, called *valves*, as it contains cells or placentas. If these valves separate at the line of junction of the carpels, that is, along the line of the placentas or dissepiments, either splitting them or leaving them attached to the axis, the dehiscence is termed *septicidal*; if the valves separate between the placentas or dissepiment, the dehiscence is

* In English descriptions, *pod* is more frequently used when it is long and narrow; *capsule*, or sometimes *pouch*, when it is short and thick or broad.

loculicidal, and the valves either bear the placentas or dissepiments along their middle line, or leave them attached to the axis. Sometimes also the capsule discharges its seeds by *slits*, *chinks*, or *pores*, more or less regularly arranged, or bursts irregularly, or separates into two parts by a horizontal line; in the latter case it is said to be *circumsciss*.

the *Nut* or *Achene*, which is indehiscent and contains but a single seed. When the pericarp is thin in proportion to the seed it encloses, the whole fruit (or each of its lobes) has the appearance of a single seed, and is so called in popular language. If the pericarp is thin and rather loose, it is often called an *Utricle*. A *Samara* is a nut with a wing at its upper end.

159. Where the carpels of the ovary are distinct (125) they may severally become as many distinct berries, drupes, capsules, or achenes. Separate carpels are usually more or less compressed laterally, with more or less prominent inner and outer edges, called *sutures*, and, if dehiscent, the carpel usually opens at these sutures. A *Follicle* is a carpel opening at the inner suture only. In some cases where the carpels are united in the ovary they will separate when ripe; they are then called *Cocci* if one-seeded.

160. The peculiar fruits of some of the large Orders have received special names, which will be explained under each Order. Such are the *siliqua* and *silicle* of Cruciferae, the *legume* of Leguminosae, the *pome* of *Pyrus* and its allies, the *pepo* of Cucurbitaceae, the *cone* of Coniferae, the *grain* or *caryopsis* of Gramineae, etc.

§ 14. The Seed.

161. The **Seed** is enclosed in the pericarp in the great majority of flowering plants, called therefore *Angiosperms*, or *angiospermous plants*. In *Coniferae* and a very few allied genera, called *Gymnosperms*, or *gymnospermous plants*, the seed is naked, without any real pericarp. These truly gymnospermous plants must not be confounded with *Labiatae*, *Boraginaceae*, etc., which have also been falsely called gymnospermous, their small nuts having the appearance of seeds (158).

162. The seed when ripe contains an *embryo* or young plant, either filling or nearly filling the cavity, but not attached to the outer skin or the seed, or more or less immersed in a mealy, oily, fleshy, or horn-like substance, called the *albumen*, or *perisperm*. The presence or absence of this albumen, that is, the distinction between *albuminous* and *exalbuminous* seeds, is one of great importance. The embryo or albumen can often only be found or distinguished when the seed is quite ripe, or sometimes only when it begins to germinate.

163. The shell of the seed consists usually of two separable *coats*. The outer coat, called the *testa*, is usually the principal one, and in most cases the only one attended to in descriptions. It may be hard and *crustaceous*, woody or bony, or thin and *membranous* (skin-like), dry, or rarely succulent. It is sometimes expanded into *wings*, or bears a tuft of hair, cotton, or wool, called a *coma*. The inner coat is called the *tegmen*.

164. The *funicle* is the stalk by which the seed is attached to the placenta. It is occasionally enlarged into a membranous, pulpy, or fleshy appendage, sometimes spreading over a considerable part of the seed, or nearly enclosing it, called an *aril*. A *strophiole* or *caruncle* is a similar appendage from the testa by the side of or near the funicle.

165. The *hilum* is the scar left on the seed where it separates from the funicle. The *micropyle* is a mark indicating the position of the foramen of the ovule (133).

166. The **Embryo** (162) consists of the *Radicle* or base of the future root, one or two *Cotyledons* or future seed-leaves, and the *Plumule* or future bud within the base of the cotyledons. In some seeds, especially where there is no albumen, these several parts are very conspicuous, in others they are very diffi-

cult to distinguish until the seed begins to germinate. Their observation, however, is of the greatest importance, for it is chiefly upon the distinction between the embryo with one or with two cotyledons that are founded the two great classes of phænogamous plants, *Monocotyledons* and *Dicotyledons*.

167. Although the embryo lies loose (unattached) within the seed, it is generally in some determinate position with respect to the seed or to the whole fruit. This position is described by stating the direction of the radicle next to or more or less remote from the *hilum*, or it is said to be *superior* if pointing towards the summit of the fruit, *inferior* if pointing towards the base of the fruit.

§ 15. Accessory Organs.

168. Under this name are included, in many elementary works, various external parts of plants which do not appear to act any essential part either in the vegetation or reproduction of the plant. They may be classed under four heads: *Tendrils* and *Hooks*, *Thorns*, and *Prickles*, *Hairs*, and *Glands*.

169. **Tendrils** (*cirrhoi*) are usually abortive petioles, or abortive peduncles, or sometimes abortive ends of branches. They are simple or more or less branched, flexible, and coil more or less firmly round any objects within their reach, in order to support the plant to which they belong. *Hooks* are similar holdfasts, but of a firmer consistence, not branched, and less coiled.

170. **Thorns** and **Prickles** have been fancifully called the weapons of plants. A *Thorn* or *Spine* is the strongly pointed extremity of a branch, or abortive petiole, or abortive peduncle. A *Prickle* is a sharply pointed excrescence from the epidermis, and is usually produced on a branch, on the petiole or veins of a leaf, or on a peduncle, or even on the calyx or corolla. When the teeth of a leaf or the stipules are pungent, they are also called *prickles*, not *thorns*. A plant is *spinous* if it has thorns, *aculeate* if it has prickles.

171. **Hairs**, in the general sense, or the *indumentum* (or clothing) of a plant, include all those productions of the epidermis which have, by a more or less appropriate comparison, been termed *bristles*, *hairs*, *down*, *cotton*, or *wool*.

172. Hairs are often branched. They are said to be *attached by the centre*, if parted from the base, and the forks spread along the surface in opposite directions; *plumose*, if the branches are arranged along a common axis, as in a feather; *stellate*, if several branches radiate horizontally. These stellate hairs have sometimes their rays connected together at the base, forming little flat circular disks attached by the centre, and are then called *scales*, and the surface is said to be *scaly* or *lepidote*.

173. The *Epidermis*, or outer skin, of an organ, as to its surface and indumentum, is

smooth, when without any protuberance whatever.

glabrous, when without hairs of any kind.

striate, when marked with parallel longitudinal lines, either slightly raised or merely discoloured.

furrowed (sulcate) or *ribbed (costate)* when the parallel lines are more distinctly raised.

rugose, when wrinkled or marked with irregular raised or depressed lines.

umbilicate, when marked with a small round depression.

umbonate, when bearing a small boss like that of a shield.

viscous, *viscid*, or *glutinous*, when covered with a sticky or clammy exudation.

scabrous, when rough to the touch.

tuberculate or *warted*, when covered with small, obtuse, wart-like protuberances.

muricate, when the protuberances are more raised and pointed but yet short and hard.

echinate, when the protuberances are longer and sharper, almost prickly.

setose or *bristly*, when bearing very stiff erect straight hairs.

glandular-setose, when the setæ or bristles terminate in a minute resinous head or drop. In some works, especially in the case of *Roses* and *Rubus*, the meaning of *setæ* has been restricted to such as are glandular.

glochidiate, when the setæ are hooked at the top.

pilose, when the surface is thinly sprinkled with rather long simple hairs.

hispid, when more thickly covered with rather stiff hairs.

hirsute, when the hairs are dense and not so stiff.

downy or *pubescent*, when the hairs are short and soft ; *puberulent*, when slightly pubescent.

strigose, when the hairs are rather short and stiff, and lie close along the surface all in the same direction ; *strigillose*, when slightly strigose.

tomentose or *cottony*, when the hairs are very short and soft, rather dense and more or less intricate, and usually white or whitish.

woolly (*lanate*), when the hairs are long and loosely intricate, like wool. The wool or tomentum is said to be *floccose* when closely intricate and readily detached, like fleece.

mealy (*farinose*), when the hairs are excessively short, intricate and white, and come off readily, having the appearance of meal or dust.

canescent or *hoary*, when the hairs are so short as not readily to be distinguished by the naked eye, and yet give a general whitish hue to the epidermis.

glaucous, when of a pale bluish-green, often covered with a fine bloom.

174. The meanings here attached to the above terms are such as appear to have been most generally adopted, but there is much vagueness in the use practically made of many of them by different botanists. This is especially the case with the terms *pilose*, *hispid*, *hirsute*, *pubescent*, and *tomentose*.

175. The name of **Glands** is given to several different productions, and principally to the four following :—

1. Small wart-like or shield-like bodies, either sessile or sometimes stalked, of a fungous or somewhat fleshy consistence, occasionally secreting a small quantity of oily or resinous matter, but more frequently dry. They are generally few in number, often definite in their position and form, and occur chiefly on the petiole or principal veins of leaves, on the branches of inflorescences, or on the stalks or principal veins of bracts, sepals, or petals.

2. Minute raised dots, usually black, red, or dark-coloured, of a resinous or oily nature, always superficial, and apparently exudations from the epidermis. They are often numerous on leaves, bracts, sepals, and green branches, and occur even on petals and stamens, more rarely on pistils. When raised upon slender stalks they are called *pedicellate* (or *stipitate*) *glands* or *glandular hairs*, according to the thickness of the stalk.

3. Small, globular, oblong or even linear vesicles, filled with oil, imbedded in the substance itself of leaves, bracts, floral organs, or fruits. They are often very numerous, like transparent dots, sometimes few and determinate in form and position. In the pericarp of *Umbelliferae* they are remarkably regular and conspicuous, and take the name of *vittæ*.

4. Lobes of the disk (137), or other small fleshy excrescences within the flower, whether from the receptacle, calyx, corolla, stamens, or pistil.

CHAP. II.—CLASSIFICATION, OR SYSTEMATIC BOTANY.

176. It has already been observed (3) that descriptions of plants should, as nearly as possible, be arranged under natural divisions, so as to facilitate the

comparison of each plant with those most nearly allied to it. The descriptions of plants here alluded to are descriptions of *species*; the natural divisions of the Flora refer to natural *groups of species*.

177. A **Species** comprises all the individual plants which resemble each other sufficiently to make us conclude that they are all, or *may have been* all, descended from a common parent. These individuals may often differ from each other in many striking particulars, such as the colour of the flower, size of the leaf, etc., but these particulars are such as experience teaches us are liable to vary in the seedlings raised from one individual.

178. When a large number of the individuals of a species differ from the others in any striking particular they constitute a **Variety**. If the variety generally comes true from seed, it is often called a *Race*.

179. A *Variety* can only be propagated with certainty by grafts, cuttings, bulbs, tubers, or any other method which produces a new plant by the development of one or more buds taken from the old one. A *Race* may with care be propagated by seed, although seedlings will always be liable, under certain circumstances, to lose those particulars which distinguish it from the rest of the species. A real *Species* will always come true from seed.

180. The known species of plants (now near 100,000) are far too numerous for the human mind to study without classification, or even to give distinct single names to. To facilitate these objects, an admirable system, invented by Linnæus, has been universally adopted, viz. one common substantive name is given to a number of species which resemble each other more than they do any other species; the species so collected under one name are collectively called a **Genus**, the common name being the *generic* name. Each species is then distinguished from the others of the same genus by the addition of an adjective epithet or *specific name*. Every species has thus a botanical name of two words. In Latin, the language usually used for the purpose, the first word is a substantive and designates the genus; the second, an adjective, indicates the species. In English, the adjective specific name comes before the substantive or generic one.

181. The genera thus formed being still too numerous (above 6000) for study without further arrangement, they have been classed upon the same principles; viz. genera which resemble each other more than they do any other genera, have been collected together into groups of a higher degree called **Families** or **Natural Orders**, to each of which a common name has been given. This name is in Latin an adjective plural, usually taken from the name of some one *typical* genus, generally the best known, the first discovered, or the most marked (e.g. *Ranunculaceæ* from *Ranunculus*). It is rendered in English by the addition of the word *plants* to a plural adjective, or by adding the word *family* or *order* to the name of the typical genus taken adjectively, as *Ranunculaceous plants* or the *Ranunculus family* (or *order*). This is however for the purpose of study and comparison. To speak of a species, to refer to it and identify it, all that is necessary is to give the generic and specific names.

182. Natural Orders themselves (of which we reckon near 200) are often in the same manner collected into **Classes**; and where Orders contain a large number of genera, or genera a large number of species, they require further classification. The genera of an Order are then collected into minor groups called *Tribes*, the species of a genus into *Sections*, and in a few cases this intermediate classification is carried still further. The names of these several groups the most generally adopted are as follows, beginning with the most comprehensive or highest:—

Classes.	Tribes.
Subclasses or <i>Alliances</i> .	Subtribes.
Natural Orders or Families.	Divisions.
Suborders.	Subdivisions.

Genera.	<i>Subsections.</i>
<i>Subgenera.</i>	Species.
Sections.	Varieties.

183. The characters (3) by which a species is distinguished from all other species of the same genus are collectively called the *specific character* of the plant; those by which its genus is distinguished from other genera of the Order or its Order from other Orders, are respectively called the *generic* or *ordinal* character, as the case may be. The *habit* of a plant, of a species, a genus, etc., consists of such general characters as strike the eye at first, such as size, colour, ramification, arrangement of the leaves, inflorescence, etc., and are chiefly derived from the organs of vegetation.

184. Classes, Orders, Genera, and their several subdivisions, are called *natural* when, in forming them, all resemblances and differences are taken into account, valuing them according to their evident or presumed importance; *artificial*, when resemblances and differences in some one or very few particulars only are taken into account independently of all others.

185. The number of species included in a genus, or the number of genera in an Order, is very variable. Sometimes two or three or even a single species may be so different from all others as to constitute the entire genus; in others, several hundred species may resemble each other so much as to be all included in one genus; and there is the same discrepancy in the number of genera to a Family. There is moreover, unfortunately, in a number of instances, great difference of opinion as to whether certain plants differing from each other in certain particulars are varieties of one species or belong to distinct species; and again, whether two or more groups of species should constitute as many sections of one genus, or distinct genera, or tribes of one Order, or even distinct Natural Orders. In the former case, as a species is supposed to have a real existence in nature, the question is susceptible of argument, and sometimes of absolute proof. But the place a group should occupy in the scale of degree is very arbitrary, being often a mere question of convenience. The more subdivisions upon correct principles are multiplied, the more they facilitate the study of plants, provided always the main resting-points for constant use, the Order and the Genus, are comprehensive and distinct. But if every group into which a genus can be divided be erected into a distinct genus, with a substantive name to be remembered whenever a species is spoken of, all the advantages derived from the beautiful simplicity of the Linnæan nomenclature are gone.

CHAP. III.—VEGETABLE ANATOMY AND PHYSIOLOGY.

§ 1. *Structure and Growth of the Elementary Tissues.*

186. If a very thin slice of any part of a plant be placed under a microscope of high magnifying power, it will be found to be made up of variously shaped and arranged ultimate parts, forming a sort of honeycombed structure. These ultimate parts are called *cells*, and form by their combination the *elementary tissues* of which the entire plant is composed.

187. A cell in its simplest state is a closed membranous sac, formed of a substance permeable by fluids, though usually destitute of visible pores. Each cell is a distinct individual, separately formed and separately acting, though cohering with the cells with which it is in contact, and partaking of the common life and action of the tissue of which it forms a part. The membranes separating or enclosing the cells are also called their *walls*.

188. Botanists usually distinguish the following tissues :—

(1) *Cellular tissue*, or *parenchyma*, consists usually of thin-walled cells, more or less round in form, or with their length not much exceeding their breadth, and not tapering at the ends. All the soft parts of the leaves, the pith of stems, the pulp of fruits, and all young growing parts, are formed of it. It is the first tissue produced, and continues to be formed while growth continues, and when it ceases to be active the plant dies.

(2) *Woody tissue*, or *prosenchyma*, differs in having its cells considerably longer than broad, usually tapering at each end into points and overlapping each other. The cells are commonly thick-walled; the tissue is firm, tenacious, and elastic, and constitutes the principal part of wood, of the inner bark, and of the nerves and veins of leaves, forming, in short, the framework of the plant.

(3) *Vascular tissue*, or the *vessels* or *ducts* of plants, so called from the mistaken notion that their functions are analogous to those of the vessels (veins and arteries) of animals. A *vessel* in plants consists of a vertical row of cells, which have their transverse partition-walls obliterated, so as to form a continuous tube. All phænogamous plants, as well as ferns and a few other cryptogamous plants, have vessels, and are therefore called *vascular plants*; so the majority of cryptogams having only cellular tissue are termed *cellular plants*. Vessels have their sides very variously marked; some, called *spiral vessels*, have a spiral fibre coiled up their inside, which unrolls when the vessel is broken; others are marked with longitudinal slits, cross bars, minute dots or pits, or with transverse rings. The size of vessels is also very variable in different plants; in some they are of considerable size and visible to the naked eye in cross sections of the stem, in others they are almost absent or can only be traced under a strong magnifier.

189. Various modifications of the above tissues are distinguished by vegetable anatomists under names which need not be enumerated here as not being in general practical use. *Air-vessels*, *cysts*, *turpentine-vessels*, *oil-reservoirs*, etc., are either cavities left between the cells, or large cells filled with peculiar secretions.

190. When tissues are once formed, they increase, not by the general enlargement of the whole of the cells already formed, but by *cell-division*, that is, by the division of young and vitally active cells, and the enlargement of their portions. In the formation of the embryo, the first cell of the new plant is formed, not by division, but around a segregate portion of the contents of a previously existing cell, the embryo-sac. This is termed *free cell-formation*, in contradistinction to cell-division.

191. A young and vitally active cell consists of the *outer wall*, formed of a more or less transparent substance called *cellulose*, permeable by fluids, and of ternary chemical composition (carbon, hydrogen, and oxygen); and of the *cell-contents*, usually viscid or mucilaginous, consisting of *protoplasm*, a substance of quaternary chemical composition (carbon, hydrogen, oxygen, and nitrogen), which fills an important part in cell-division and growth. Within the cell (either in the centre or excentric) is usually a minute, soft, subgelatinous body called the *nucleus*, whose functions appear to be intimately connected with the first formation of the new cell. As this cell increases in size, and its walls in thickness, the protoplasm and watery cell-sap become absorbed or dried up, the firm cellulose wall alone remaining as a permanent fabric, either empty or filled with various organized substances produced or secreted within it.

192. The principal organized contents of cells are

sap, the first product of the digestion of the food of plants; it contains the elements of vegetable growth in a dissolved condition.

sugar, of which there are two kinds, called *cane-sugar* and *grape-sugar*. It usually exists dissolved in the sap. It is found abundantly in growing parts, in fruits, and in germinating seeds.

dextrine, or vegetable mucilage, a gummy substance, between mucilage and starch.

starch or *fecula*, one of the most universal and conspicuous of cell-contents, and often so abundant in farinaceous roots and seeds as to fill the cell-cavity. It consists of minute grains called *starch-granules*, which vary in size and are marked with more or less conspicuous concentric lines of growth. The chemical constitution of starch is the same as that of cellulose; it is unaffected by cold water, but forms a jelly with boiling water, and turns blue when tested by iodine. When fully dissolved it is no longer starch, but dextrine.

chlorophyll, very minute granules, containing nitrogen, and coloured green under the action of sunlight. These granules are most abundant in the layers of cells immediately below the surface or epidermis of leaves and young bark. The green colouring matter is soluble in alcohol, and may thus be removed from the granules.

chromule, a name given to a similar colouring matter when not green.

wax, *oils*, *camphor*, and *resinous* matter, are common in cells or in cavities in the tissues between the cells, also various mineral substances, either in an amorphous state or as microscopic crystals, when they are called *Raphides*.

§ 2. *Arrangement of the Elementary Tissues, or Structure of the Organs of Plants.*

193. Leaves, young stems, and branches, and most parts of phænogamous plants, during the first year of their existence consist anatomically of

1, a *cellular system*, or continuous mass of cellular tissue, which is developed both vertically as the stem or other parts increase in length, and horizontally or laterally as they increase in thickness or breadth. It surrounds or is intermixed with the fibro-vascular system, or it may exist alone in some parts of phænogamous plants, as well as in cryptogamous ones.

2, a *fibro-vascular system*, or continuous mass of woody and vascular tissue, which is gradually introduced vertically into, and serves to bind together, the cellular system. It is continued from the stem into the petioles and veins of the leaves, and into the pedicels and parts of the flowers, and is never wholly wanting in any phænogamous plant.

3, an *epidermis*, or outer skin, formed of one or more layers of flattened (horizontal), firmly coherent, and usually empty cells, with either thin and transparent, or thick and opaque walls. It covers almost all parts of plants exposed to the outward air, protecting their tissues from its immediate action, but is wanting in those parts of aquatic plants which are constantly submerged.

194. The epidermis is frequently pierced by minute spaces between the cells, called *Stomates*. They are oval or mouth-shaped, bordered by *lips*, formed of two or more elastic cells so disposed as to cause the stomate to open in a moist, and to close up in a dry state of the atmosphere. They communicate with intercellular cavities, and are obviously designed to regulate evaporation and respiration. They are chiefly found upon leaves, especially on the under surface.

195. When a phænogamous plant has outlived the first season of its growth, the anatomical structure of its stem or other perennial parts becomes more complicated and very different in the two great classes of phænogamous plants called *Exogens* and *Endogens*, which correspond with very few exceptions to the two classes Dicotyledons and Monocotyledons (167), founded on the structure of the embryo. In Exogens (Dicotyledons) the woody system is placed in concentric layers between a central *pith* (198, 1), and an external separable *bark* (198, 5). In Endogens (Monocotyledons) the woody system is in separate small bundles or fibres running through the cellular system without apparent order, and there is usually no distinct central pith, nor outer separable bark.

196. The anatomical structure is also somewhat different in the different

organs of plants. In the **Root**, although it is constructed generally on the same plan as the stem, yet the regular organization, and the difference between Exogens and Endogens, is often disguised or obliterated by irregularities of growth, or by the production of large quantities of cellular tissue filled with starch or other substances (192). There is seldom, if ever, any distinct pith, the concentric circles of fibro-vascular tissue in Exogens are often very indistinct or have no relation to seasons of growth, and the epidermis has no stomates.

197. In the **Stem** or branches, during the first year or season of their growth, the difference between Exogens and Endogens is not always very conspicuous. In both there is a tendency to a circular arrangement of the fibro-vascular system, leaving the centre either vacant or filled with cellular tissue (pith) only, and a more or less distinct outer rind is observable even in several Endogens. More frequently, however, the distinction is already very apparent the first season, especially towards its close. The fibro-vascular bundles in Endogens usually anastomose but little, passing continuously into the branches and leaves. In Exogens the circle of fibro-vascular bundles forms a more continuous cylinder of network emitting lateral offsets into the branches and leaves.

198. The Exogenous stem, after the first year of its growth, consists of

- 1, the *pith*, a cylinder of cellular tissue, occupying the centre or longitudinal axis of the stem. It is active only in young stems or branches, becomes dried up and compressed as the wood hardens, and often finally disappears, or is scarcely distinguishable in old trees.

- 2, the *medullary sheath*, which surrounds and encases the pith. It abounds in spiral vessels (188, 3), and is in direct connection, when young, with the leaf-buds and branches, with the petioles and veins of leaves, and other ramifications of the system. Like the pith, it gradually disappears in old wood.

- 3, the *wood*, which lies immediately outside the medullary sheath. It is formed of woody tissue (188, 2), through which, in most cases, vessels (188, 3) variously disposed are interspersed. It is arranged in annual concentric circles (211), which usually remain active during several years, but in older stems the central and older layers become hard, dense, comparatively inactive, and usually deeper coloured, forming what is called *heart-wood* or *duramen*, the outer, younger, and usually paler-coloured living layers constituting the *sapwood* or *alburnum*.

- 4, the *medullary rays*, which form vertical plates, originating in the pith, and, radiating from thence, traverse the wood and terminate in the bark. They are formed of cellular tissue, keeping up a communication between the living portion of the centre of the stem and its outer surface. As the heart-wood is formed, the inner portion of the medullary rays ceases to be active, but they usually may still be seen in old wood, forming what carpenters call the *silver grain*.

- 5, the *bark*, which lies outside the wood, within the epidermis. It is, like the wood, arranged in annual concentric circles (211), of which the outer older ones become dry and hard, forming the *corky layer* or *outer bark*, which, as it is distended by the thickening of the stem, either cracks or is cast off with the epidermis, which is no longer distinguishable. Within the corky layer is the *cellular*, or *green*, or *middle bark*, formed of loose thin-walled pulpy cells containing chlorophyll (192); and which is usually the layer of the preceding season. The innermost and youngest circle, next the young wood, is the *liber* or *inner bark*, formed of long tough woody tissue called *bast-cells*.

199. The Endogenous stem, as it grows old, is not marked by the concentric circles of Exogens. The wood consists of a *matrix* of cellular tissue irregularly traversed by vertical cords or bundles of woody and vascular tissue, which are in connection with the leaves. These vascular bundles change in structure and direction as they pass down the stem, losing their vessels, they retain only their bast- or long wood-cells, usually curving outwards towards the rind. The

old wood becomes more compact and harder towards the circumference than in the centre. The epidermis or rind either hardens so as to prevent any increase of diameter in the stem, or it distends, without increasing in thickness or splitting or casting off any outer layers.

200. In the **Leaf**, the structure of the petioles and principal ribs or veins is the same as that of the young branches of which they are ramifications. In the expanded portion of the leaf the fibro-vascular system becomes usually very much ramified, forming the smaller veins. These are surrounded and the interstices filled up by a copious and very active cellular tissue. The majority of leaves are horizontal, having a differently constructed upper and under surface. The cellular stratum forming the upper surface consists of closely-set cells, placed vertically, with their smallest ends next the surface, and with few or no stomates in the epidermis. In the stratum forming the under surface, the cells are more or less horizontal, more loosely placed, and have generally empty spaces between them, with stomates in the epidermis communicating with these intercellular spaces. In vertical leaves (as in a large number of Australian plants) the two surfaces are nearly similar in structure.

201. When leaves are reduced to scales, acting only as protectors of young buds, or without taking any apparent part in the economy of vegetable life, their structure, though still on the same plan, is more simple; their fibro-vascular system is less ramified, their cellular system more uniform, and there are few or no stomates.

202. Bracts and floral envelopes, when green and much developed, resemble leaves in their anatomical structure, but in proportion as they are reduced to scales or transformed into petals, they lose their stomates, and their systems, both fibro-vascular and cellular, become more simple and uniform, or more slender and delicate.

203. In the stamens and pistils the structure is still nearly the same. The fibro-vascular system, surrounded by and intermixed with the cellular tissue, is usually simple in the filaments and style, more or less ramified in the flattened or expanded parts, such as the anther-cases, the walls of the ovary, or carpellary leaves, etc. The pollen consists of granular cells variously shaped, marked, or combined, peculiar forms being constant in the same species, or often in large genera, or even Orders. The stigmatic portion of the pistil is a mass of loosely cellular substance, destitute of epidermis, and usually is in communication with the ovary by a channel running down the centre of the style.

204. Tubers, fleshy thickenings of the stem or other parts of the plant, succulent leaves or branches, the fleshy, woody, or bony parts of fruits, the albumen, and the thick fleshy parts of embryos, consist chiefly of largely developed cellular tissue, replete with starch or other substances (192), deposited apparently in most cases for the eventual future use of the plant or its parts when recalled into activity at the approach of a new season.

205. Hairs (171) are usually expansions or processes of the epidermis, and consist of one or more cells placed end to end. When thick or hardened into prickles, they still consist usually of cellular tissue only. Thorns (170) contain more or less of a fibro-vascular system, according to their degree of development.

206. Glands, in the primary sense of the word (175, 1), consist usually of a rather loose cellular tissue without epidermis, and often replete with resinous or other substances.

§ 3. *Growth of the Organs.*

207. Roots grow in length constantly and regularly at the extremities only of their fibres, in proportion as they find the requisite nutriment. They form no buds containing the germ of future branches, but their fibres proceed irregularly from any part of their surface without previous indication, and when

their growth has been stopped for a time, either wholly by the close of the season, or partially by a deficiency of nutriment at any particular spot, it will, on the return of favourable circumstances, be resumed at the same point, if the growing extremities be uninjured. If during the dead season, or at any other time, the growing extremity is cut off, dried up, or otherwise injured, or stopped by a rock or other obstacle opposing its progress, lateral fibres will be formed on the still living portion; thus enabling the root as a whole to diverge in any direction, and travel far and wide when lured on by appropriate nutriment.

208. This growth is not however by the successive formation of terminal cells attaining at once their full size. The cells first formed on a fibre commencing or renewing its growth, will often dry up and form a kind of terminal cap, which is pushed on as cells are formed immediately under it; and the new cells, constituting a greater or lesser portion of the ends of the fibres, remain some time in a growing state before they have attained their full size.

209. The roots of Exogens, when perennial, increase in thickness like stems by the addition of concentric layers, but these are usually much less distinctly marked; and in a large number of perennial Exogens and most Endogens the roots are annual, perishing at the close of the season, fresh adventitious roots springing from the stock when vegetation commences the following season.

110. The Stem, including its branches and appendages (leaves, floral organs, etc.), grows in length by additions to its extremity, but a much greater proportion of the extremity and branches remains in a growing and expanding state for a much longer time than in the case of the root. At the close of one season, leaf-buds or seeds are formed, each containing the germ of a branch or young plant to be produced the following season. At a very early stage of the development of these buds or seeds, a commencement may be found of many of the leaves it is to bear; and before a leaf unfolds, every leaflet of which it is to consist, every lobe or tooth which is to mark its margin, may often be traced in miniature, and thenceforth till it attains its full size, the branch grows and expands in every part. In some cases however the lower part of a branch, and more rarely (*e.g.* in some *Meliaceae*) the lower part of a compound leaf, attains its full size before the young leaves or leaflets of the extremity are yet formed.

211. The perennial stem, if exogenous (198), grows in thickness by the addition every season of a new layer or ring of wood between the outermost preceding layer and the inner surface of the bark, and by the formation of a new layer or ring of bark within the innermost preceding layer and outside the new ring of wood, thus forming a succession of concentric circles. The sap elaborated by the leaves finds its way, in a manner not as yet absolutely ascertained, into the *cambium-region*, a zone of tender thin-walled cells connecting the wood with the bark, by the division and enlargement of which new cells (190) are formed. These cells separate in layers, the inner ones constituting the new ring of wood, and the outer ones the new bark or liber. In most exogenous trees, in temperate climates, the seasons of growth correspond with the years, and the rings of wood remain sufficiently distinct to indicate the age of the tree; but in many tropical and some evergreen trees, two or more rings of wood are formed in one year.

212. In endogenous perennial stems (199), the new wood or woody fibre is formed towards the centre of the stem, or irregularly mingled with the old. The stem consequently either only becomes more dense without increasing in thickness, or only increases by gradual distention, which is never very considerable. It affords therefore no certain criterion for judging of the age of the tree.

213. Flowers have generally all their parts formed, or indicated by protuberances or growing cells at a very early stage of the bud. These parts are then usually more regularly placed than in the fully developed flower. Parts

which afterwards unite are then distinct, many are present in this rudimentary state which are never further developed, and parts which are afterwards very unequal or dissimilar are perfectly alike at this early period. On this account flowers in this very early stage are supposed by some modern botanists to be more *normal*, that is, more in conformity to a supposed type; and the study of the early formation and growth of the floral organs, called *Organogenesis*, has been considered essential for the correct appreciation of the affinities of plants. In some cases, however, it would appear that modifications of development, not to be detected in the very young bud, are yet of great importance in the distinction of large groups of plants, and that *Organogenesis*, although it may often assist in clearing up a doubtful point of affinity, cannot nevertheless be exclusively relied on in estimating the real value of peculiarities of structure.

214. The flower is considered as a *bud* (*flower-bud*, *alabastrum*) until the perianth expands, the *period of flowering* (*anthesis*) is that which elapses from the first expanding of the perianth, till the pistil is set or begins to enlarge, or, when it does not set, until the stamens and pistil wither or fall. After that, the enlarged ovary takes the name of *young fruit*.

215. At the close of the season of growth, at the same time as the leaf-buds or seeds are formed containing the germ of future branches or plants, many plants form also, at or near the bud or seed, large deposits, chiefly of starch. In many cases,—such as the tubers of a potato or other root-stock, the scales or thickened base of a bulb, the albumen or the thick cotyledons of a seed,—this deposit appears to be a store of nutriment, which is partially absorbed by the young branch or plant during its first stage of growth, before the roots are sufficiently developed to supply it from without. In some cases, however, such as the fleshy thickening of some stems or peduncles, the pericarps of fruits which perish long before *germination* (the first growth of the seed), neither the use nor the cause of these deposits has as yet been clearly explained.

§ 4. *Functions of the Organs.*

216. The functions of the Root are,—1. To fix the plant in or to the soil, or other substance on which it grows. 2. To absorb nourishment from the soil, water, or air, into which the fibres have penetrated (or from other plants in the case of parasites), and to transmit it rapidly to the stem. The absorption takes place through the young growing extremities of the fibres, and through a peculiar kind of hairs or absorbing organs which are formed at or near those growing extremities. The transmission to the stem is through the tissues of the root itself. The nutriment absorbed consists chiefly of carbonic acid and nitrogen or nitrogenous compounds dissolved in water. 3. In some cases roots secrete or exude small quantities of matter in a manner and with a purpose not satisfactorily ascertained.

217. The Stem and its branches support the leaves, flowers, and fruit, transmit the crude sap, or nutriment absorbed by the roots and mixed with previously organized matter, to the leaves, and re-transmit the assimilated or elaborated sap from the leaves to the growing parts of the plant, to be there used up, or to form deposits for future use (204). The transmission of the ascending crude sap appears to take place chiefly through the elongated cells associated with the vascular tissues, passing from one cell to another by a process but little understood, but known by the name of *endosmose*.

218. Leaves are functionally the most active of the organs of vegetation. In them is chiefly conducted digestion or *Assimilation*, a name given to the process which accomplishes the following results:—1. The chemical decomposition of the oxygenated matter of the sap, the absorption of carbonic acid, and the liberation of pure oxygen at the ordinary temperature of the air. 2. A counter-operation by which oxygen is absorbed from the atmosphere and carbonic acid

is exhaled. 3. The transformation of the residue of the crude sap into the organized substances which enter into the composition of the plant. The exhalation of oxygen appears to take place under the influence of solar heat and light, chiefly from the under surface of the leaf, and to be in some measure regulated by the stomates; the absorption of oxygen goes on always in the dark, and in the daytime also in certain cases. The transformation of the sap is effected within the tissues of the leaf, and continues probably more or less throughout the active parts of the whole plant.

219. The Floral Organs seldom contribute to the growth of the plant on which they are produced; their functions are wholly concentrated on the formation of the seed with the germ of a future plant.

220. The Perianth (calyx and corolla) acts in the first instance in protecting the stamens and pistils during the early stages of their development. When expanded, the use of the brilliant colours which they often display, of the sweet or strong odours they emit, has not been adequately explained. Perhaps they may have great influence in attracting those insects whose concurrence has been shown in many cases to be necessary for the due transmission of the pollen from the anther to the stigma.

221. The pistil, when stimulated by the action of the pollen, forms and nourishes the young seed. The varied and complicated contrivances by which the pollen is conveyed to the stigma, whether by elastic action of the organs themselves, or with the assistance of wind, of insects, or other extraneous agents, have been the subject of numerous observations and experiments of the most distinguished naturalists, and are yet far from being fully investigated. Their details, however, as far as known, would be far too long for the present outline.

222. The fruit nourishes and protects the seed until its maturity, and then often promotes its dispersion by a great variety of contrivances or apparently collateral circumstances, *e.g.* by an elastic dehiscence which casts the seed off to a distance; by the development of a pappus, wings, hooked or other appendages, which allows them to be carried off by winds, or by animals, etc., to which they may adhere; by their small specific gravity, which enables them to float down streams; by their attractions to birds, etc., who taking them for food drop them often at great distances, etc. Appendages to the seeds themselves also often promote dispersion.

223. Hairs have various functions. The ordinary indumentum (171) of stems and leaves indeed seems to take little part in the economy of the plant besides perhaps some occasional protection against injurious atmospheric influences, but the root-hairs (216) are active absorbents, the hairs on styles and other parts of flowers appear often materially to assist the transmission of pollen, and the exudations of glandular hairs (175, 2) are often too copious not to exercise some influence on the phenomena of vegetation. The whole question, however, of vegetable exudations and their influence on the economy of vegetable life, is as yet but imperfectly understood.

CHAP. IV.—COLLECTION, PRESERVATION, AND DETERMINATION OF PLANTS.

224. Plants can undoubtedly be most easily and satisfactorily examined when freshly gathered. But time will rarely admit of this being done, and it is moreover desirable to compare them with other plants previously observed or collected. *Specimens* must, therefore, be selected for leisurely observation at home, and preserved for future reference. A collection of such specimens constitutes a *Herbarium*.

225. A botanical **Specimen**, to be perfect, should have *root, stem, leaves, flowers* (both open and in bud) and *fruit* (both young and mature). It is not, however, always possible to gather such complete specimens, but the collector should aim at completeness. Fragments, such as leaves without flowers, or flowers without leaves, are of little or no use.

226. If the plant is small (not exceeding 15 in.) or can be reduced to that length by folding, the specimen should consist of the whole plant, including the principal part of the root. If it be too large to preserve the whole, a good flowering branch should be selected, with the foliage as low down as can be gathered with it; and one or two of the lower stem-leaves, or radical leaves, if any, should be added, so as to preserve as much as possible of the peculiar aspect of the plant.

227. The specimens should be taken from healthy uninjured plants of a medium size. Or if a specimen be gathered because it looks a little different from the majority of those around it, apparently belonging to the same species, a specimen of the more prevalent form should be taken from the same locality for comparison.

228. For bringing the specimens home, a light portfolio of pasteboard, covered with calico or leather, furnished with straps and buckles for closing, and another for slinging on the shoulder, and containing a few sheets of stout coarse paper, is better than the old-fashioned tin box (except, perhaps, for stiff prickly plants and a few others). The specimens as gathered are placed between the leaves of paper, and may be crowded together if not left long without sorting.

229. If the specimen brought home be not immediately determined when fresh, but dried for future examination, a note should be taken of the time, place, and situation in which it was gathered; of the stature, habit, and other particulars relating to any tree, shrub, or herb of which the specimen is only a portion; of the kind of root it has; of the colour of the flower; or of any other particulars which the specimen itself cannot supply, or which may be lost in the process of drying. These memoranda, whether taken down in the field, or from the living specimen when brought home, should be written on a label attached to the specimen or preserved with it.

230. To dry specimens, they are laid flat between several sheets of bibulous paper, and subjected to pressure. The paper is subsequently changed at intervals, until they are dry.

231. In laying out the specimen, care should be taken to preserve the natural position of the parts as far as consistent with the laying flat. In general, if the specimen is fresh and not very slender, it may be simply laid on the lower sheet, holding it by the stalk and drawing it slightly downwards; then, as the upper sheet is laid over, if it be slightly drawn downwards as it is pressed down, it will be found, after a few trials, that the specimen will have retained a natural form with very little trouble. If the specimen has been gathered long enough to have become flaccid, it will require more care in laying the leaves flat and giving the parts their proper direction. Specimens kept in tin boxes will also often have taken unnatural bends, which will require to be corrected.

232. If the specimen is very bushy, some branches must be thinned out, but always so as to show where they have been. If any part, such as the head of a thistle, the stem of an *Orobanche*, or the bulb of a Lily, be very thick, a portion of what is to be the underside of the specimen may be sliced off. Some thick specimens may be split from top to bottom before drying.

233. If the specimen be succulent or tenacious of life, such as a *Sedum* or an *Orchis*, it may be dipped in boiling water *all but the flowers*. This will kill the plant at once, and enable it to be dried rapidly, losing less of its colour or foliage than would otherwise be the case. Dipping in boiling water is also useful in the case of Heaths and other plants, which are apt to shed their leaves during the process of drying.

234. Plants with very delicate corollas may be placed between single leaves of very thin unglazed tissue-paper. In shifting these plants into dry paper the tissue-paper is not to be removed, but lifted with its contents on to the dry paper.

235. The number of sheets of paper to be placed between each specimen or sheet of specimens, will depend, on the one hand, on the thickness and humidity of the specimens; on the other hand, on the quantity and quality of the paper one has at command. The more and the better the paper, the less frequently will it be necessary to change it, and the sooner the plants will dry. The paper ought to be coarse, stout, and unsized. Common blotting-paper is much too tender.

236. Care must be taken that the paper used is well dried. If it be likewise hot, all the better; but it must then be very dry; and wet plants put into hot paper will require changing very soon, to prevent their turning black, for hot damp without ventilation produces fermentation, and spoils the specimens.

237. For pressing plants, various more or less complicated and costly presses are made. None is better than a pair of boards the size of the paper, and a stone or other heavy weight upon them if at home, or a pair of strong leather straps round them if travelling. Each of these boards should be double, that is, made of two layers of thin boards, the opposite way of the grain, and joined together by a row of clenched brads round the edge, without glue. Such boards, in deal, rather less than half an inch thick (each layer about $2\frac{1}{2}$ lines) will be found light and durable.

238. It is useful also to have extra boards or pasteboards the size of the paper, to separate thick plants from thin ones, wet ones from those nearly dry, etc. Open wooden frames with cross-bars, or frames of strong wire-work lattice, are still better than boards for this purpose, as accelerating the drying by promoting ventilation.

239. The more frequently the plants are shifted into dry paper the better. Excepting for very stiff or woody plants, the first pressure should be light, and the first shifting, if possible, after a few hours. Then, or at the second shifting, when the specimens will have lost their elasticity, will be the time for putting right any part of a specimen which may have taken a wrong fold or a bad direction. After this the pressure may be gradually increased, and the plants left from one to several days without shifting. The exact amount of pressure to be given will depend on the consistence of the specimens, and the amount of paper. It must only be borne in mind that too much pressure crushes the delicate parts, too little allows them to shrivel, in both cases interfering with their future examination.

240. The most convenient specimens will be made, if the drying-paper is the same size as that of the herbarium in which they are to be kept. That of writing demy, rather more than 16 inches by $10\frac{1}{2}$ inches, is a common and very convenient size. A small size reduces the specimens too much, a large size is both costly and inconvenient for use.

241. When the specimens are quite dry and stiff, they may be packed up in bundles with a single sheet of paper between each layer, and this paper need not be bibulous. The specimens may be placed very closely on the sheets, but not in more than one layer on each sheet, and care must be taken to protect the bundles by sufficient covering from the effects of external moisture or the attacks of insects.

242. In laying the specimens into the herbarium, no more than one species should ever be fastened on one sheet of paper, although several specimens of the same species may be laid side by side. And throughout the process of drying, packing, and laying in, great care must be taken that the labels be not separated from the specimens they belong to.

243. To examine or dissect flowers or fruits in dried specimens it is necessary

to soften them. If the parts are very delicate, this is best done by gradually moistening them in cold water; in most cases, steeping them in boiling water or in steam is much quicker. Very hard fruits and seeds will require boiling to be able to dissect them easily.

244. For dissecting and examining flowers in the field, all that is necessary is a penknife and a pocket-lens of two or three glasses from 1 to 2 inches focus. At home it is more convenient to have a mounted lens or simple microscope, with a stage holding a glass plate, upon which the flowers may be laid; and a pair of dissectors, one of which should be narrow and pointed, or a mere point, like a thick needle, in a handle; the other should have a pointed blade, with a sharp edge, to make clean sections across the ovary. A compound microscope is rarely necessary, except in cryptogamic botany and vegetable anatomy. For the simple microscope, lenses of $\frac{1}{4}$, $\frac{1}{2}$, 1, and $1\frac{1}{2}$ inches focus are sufficient.

245. To assist the student in *determining* or ascertaining the name of a plant belonging to a Flora, analytical tables are in this work prefixed to the Orders, Genera, and Species. These tables are so constructed as to contain, under each bracket, or equally indented, two (rarely three or more) alternatives as nearly as possible contradictory or incompatible with each other, each alternative referring to another bracket, or having under it another pair of alternatives further indented. The student having a plant to determine, will first take the general table of Natural Orders, and examining his plant at each step to see which alternative agrees with it, will be led on to the Order to which it belongs, he will then compare it with the detailed character of the Order given in the text. If it agrees, he will follow the same course with the table of the genera of that Order to find the genus, and again with the key of the species of that genus to find the species.

Suppose the plant to be a Dandelion, a Daisy, or a Thistle. On opening what appears to be the flower, we see at once that each part, which we may at first have taken for a petal, contains a separate style, and has a separate ovary (appearing like a seed) under it, but no separate calyx, all these florets being collected within a common involucre. The flower is therefore compound. Our attention is also called to the anthers. They may at first escape the beginner, but with a little care they will be discovered forming a ring round the style. We may then conclude that our plant agrees with the first alternative which refers to the second bracket. We must now look to the ovary under any one of the florets, cut it open, and, finding but a single ovule or seed, we are referred to the great Order of Composites. This second bracket is only necessary to exclude two or three Campanulaceous plants (*Phyteuma* and *Jasione*), which have the united anthers and heads of flowers of Composites, but are most readily known by the numerous small ovules or seeds in their ovary or fruit. On turning to the description of the Order Composites, we are cautioned against confounding with them two or three other plants which have similar heads of flowers, and being satisfied we are right, we proceed in the same manner to find out the genus of our plant.

Suppose the plant to be a Violet. Although the anthers are united in a ring, the flowers are quite separate, each with its own calyx, and we are referred by the second alternative to the third bracket, the double perianth refers us to the fifth, the free ovary to the sixth, the single ovary to the seventh, the irregular corolla to the forty-first, the spur to one of the petals to the forty-second, the five stamens to the forty-third, under which the five sepals and petals indicate at once the genus Violet. We then compare our plant with the description of the genus in the Flora, before we proceed to ascertain the species. In making use of these descriptions, the beginner must be careful not to be misled by the popular meaning of terms to which a technical sense has been given by botanists, and in all cases of doubt he should refer to the definitions through the Index of Terms.

After a little habit, this mechanical process will be much abridged. The great divisions of the general analytical table will be at once recognized, and very soon the large Orders and genera will become so familiar, that in most cases the amateurs will only have to commence with them. Yet in all cases of doubt and hesitation, wherever the plant does not agree perfectly with the generic character and description, he must revert to the beginning, and carefully go through every step of the investigation before he can be satisfied.

And notwithstanding the care that has been bestowed on the framing of the analytical keys of the present work, and the number of cases in which they have been verified, specimen in hand, through every stage, it cannot be hoped that they have been rendered so precise as to preclude doubt. The beginner especially will often be at a loss as to which alternative agrees the best with the plant he is examining, and one false step may lead him far away from the object he is seeking. But let him not be discouraged; perseverance, a fresh examination of his specimen, or of others of the same plant, a critical consideration of the meaning of every expression in the characters given, may lead him to detect some minute point overlooked or mistaken, and put him in the right way. Even experienced botanists, provided with the most detailed descriptions in systematic works of the highest repute, are occasionally led into false determinations. Species vary within limits which it is often very difficult to express in words. In making an analytical table, it often proves impossible so to divide the genera or species which have to come under one bracket, as that each alternative must exclude all that come under the other one. In such cases it has been found expedient to make both alternatives lead to the doubtful genus or species, although for brevity's sake this has been avoided when not thought absolutely necessary.

246. In those Floras where analytical tables are not given, the student is usually guided to the most important or prominent characters of each genus or species, either by a general summary prefixed to the genera of an Order or to the species of the genus, for all such genera or species; or by a special summary immediately preceding the detailed description of each genus or species. In the latter case this summary is called a *diagnosis*. Or sometimes the important characters are only indicated by italicizing them in the detailed description.

247. It may also happen that the specimen gathered may present some occasional or accidental anomalies peculiar to that single one, or to a very few individuals, which may prevent the species from being at once recognized by its technical characters. It may be useful here to point out a few of these anomalies which the botanist may be most likely to meet with. For this purpose we may divide them into two classes, viz.:

1. *Aberrations from the ordinary type or appearance of a species for which some general cause may be assigned.*

A bright, light, and open situation, particularly at considerable elevations above the sea, or at high latitudes, without too much wet or drought, tends to increase the size and heighten the colour of flowers, in proportion to the stature and foliage of the plant.

Shade, on the contrary, especially if accompanied by richness of soil and sufficient moisture, tends to increase the foliage and draw up the stem, but to diminish the number, size, and colour of the flowers.

A hot climate and dry situation tend to increase the hairs, prickles, and other productions of the epidermis, to shorten and stiffen the branches, rendering thorny plants yet more spinous. Moisture in a rich soil has a contrary effect.

The neighbourhood of the sea, or a saline soil or atmosphere, imparts a thicker and more succulent consistence to the foliage and almost every part of the plant, and appears not unfrequently to enable plants usually annual to live

through the winter. Flowers in a maritime variety are often much fewer, but not smaller.

The luxuriance of plants growing in a rich soil, and the dwarf stunted character of those crowded in poor soils, are too well known to need particularizing. It is also an everyday observation how gradually the specimens of a species become dwarf and stunted as we advance into the cold damp regions of the summits of high mountain-ranges, or into high northern latitudes; and yet it is frequently from the want of attention to these circumstances that numbers of false species have been added to our Enumerations and Floras. Luxuriance entails not only increase of size to the whole plant, or of particular parts, but increase of number in branches, in leaves, or leaflets of a compound leaf; or it may diminish the hairiness of the plant, induce thorns to grow out into branches, etc.

Capsules which, while growing, lie close upon the ground, will often become larger, more succulent, and less readily dehiscent, than those which are not so exposed to the moisture of the soil.

Herbs eaten down by sheep or cattle, or crushed underfoot, or otherwise checked in their growth, or trees or shrubs cut down to the ground, if then exposed to favourable circumstances of soil and climate, will send up luxuriant side-shoots, often so different in the form of their leaves, in their ramification and inflorescence, as to be scarcely recognizable for the same species.

Annuals which have germinated in spring, and flowered without check, will often be very different in aspect from individuals of the same species, which, having germinated later, are stopped by summer droughts or the approach of winter, and only flower the following season upon a second growth. The latter have often been mistaken for perennials.

Hybrids, or crosses between two distinct species, come under the same category of anomalous specimens from a known cause. Frequent as they are in gardens, where they are artificially produced, they are probably rare in nature, although on this subject there is much diversity of opinion, some believing them to be very frequent, others almost denying their existence. Absolute proof of the origin of a plant found wild, is of course impossible; but it is pretty generally agreed that the following particulars must always co-exist in a *wild hybrid*. It partakes of the characters of its two parents; it is to be found isolated, or almost isolated, in places where the two parents are abundant; if there are two or three, they will generally be dissimilar from each other, one partaking more of one parent, another of the other; it seldom ripens good seed; it will never be found where one of the parents grows alone.

Where two supposed species grow together, intermixed with numerous intermediates bearing good seed, and passing more or less gradually from the one to the other, it may generally be concluded that the whole are mere varieties of one species. The beginner, however, must be very cautious not to set down a specimen as intermediate between two species, because it appears to be so in some, even the most striking characters, such as stature and foliage. Extreme varieties of one species are connected together by transitions in all their characters, but these transitions are not all observable in the same specimens. The observation of a single intermediate is therefore of little value, unless it be one link in a long series of intermediate forms, and, when met with, should lead to the search for the other connecting links.

2. *Accidental aberrations from the ordinary type, that is, those of which the cause is unknown.*

These require the more attention as they may sometimes lead the beginner far astray in his search for the genus, whilst the aberrations above-mentioned as reducible more or less to general laws, affect chiefly the distinction of species.

Almost all species with coloured flowers are liable to occur occasionally with them all white.

Many may be found even in a wild state with double flowers, that is, with a multiplication of petals.

Plants which have usually conspicuous petals will occasionally appear without any at all, either to the flowers produced at particular seasons, or to all the flowers of individual plants, or the petals may be reduced to narrow slips.

Flowers usually very irregular may, on certain individuals, lose more or less of their irregularity, or appear in some very different shape. Spurs, for instance, may disappear, or be produced on all instead of one only of the petals.

One part may be occasionally added to, or subtracted from, the usual number of parts in each floral whorl, more especially in regular polypetalous flowers.

Plants usually monœcious or diœcious may become occasionally hermaphrodite, or hermaphrodite plants may produce occasionally unisexual flowers by the abortion of the stamens or of the pistils.

Leaves cut or divided where they are usually entire, variegated or spotted where they are usually of one colour, or the reverse, must also be classed amongst those accidental aberrations which the botanist must always be on his guard against mistaking for specific distinctions.

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riod)	214	Blade	35	Chromule	192
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Apex	36, 47, 115	Bracteate=having bracts.		Circumsciss	158
Apiculate=with a little		Bracteoles	62	Cirrhous=tendrils . . .	169
point.		Bristles, bristly	173		

	P.A.R.		P.A.R.		P.A.R.
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Coats of the seed	163	Depressed	54	Epigynous disk	144
Coccus	159	Descriptive Botany (p. xi.)		Epiphyte	14
Coherent	145	Determinate	67	Erect	28
Collateral=inserted one by the side of the other.		Determination of plants	245	Exalbuminous (without albumen)	162
Collection of specimens	224	Dextrine	192	Examination of plants	243
Coma	163	Di- (2 in composition)	92	Exogens, exogenous plants	195
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Contorted, convolute	102	Dimidiate	117	Fibro-vascular system	193
Cordate	49	Diœcious	86	Filament	109
Cordiform	49	Dipetalous	93	Filiform=thread-like.	
Coriaceous	55	Disepalous	93	Fimbriate=fringed.	
Corky layer	198	Disk	136	Flabelliform=fan-shaped	45
Corm	27	Dissepiment	126	Fleshy	55
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Creeping	28	Dorsal=on the back.		Follicle	159
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Cristate=having a crest- like appendage.		Down, downy	173	Forked	33
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Crumpled	102	Dry Fruits	158	Fruit	15, 146, 222
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Cuspidate	47	Echinate	173	Furrowed	173
Cylindrical	54	Elaborated sap	217	Fusiform=spindle-shaped	54
Cyme, cymose	74	Elementary cells and tis- sues	186		
		Elliptical	45	Gamopetalous	100
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				Glaucous	173

	PAR.		PAR.		PAR.
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Glochidiate	173	Knob	25	Neuter	85
Glume	83			Node	31
Glutinous	173	Labellum	105	Novem- (9 in composition)	44
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		Lanceolate	45		
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Hastate	50	Leaf-bud	16	Obcordate	47
Head	74	Leaflet	39	Oblate	45
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Hepta- (7 in composition)	92	Legume	160	Obovate	45
Herbaceous perennials .	12	Lepidote	172	Obovoid	54
Herbarium	224	Liber	198, 211	Obpyramidal	54
Hermaphrodite	85	Ligulate = strap-shaped.		Obtuse	47
Heterogamous	87	Limb	104	Oct- or octo- (8 in com- position)	44, 92
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Hilum	165	Lip, lipped	105	Opposite	32
Hirsute	173	Lobe, lobed	39	Orbicular	45
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Hybrids	247	Male	85	Oval	45
Hypocrateriform (salver- shaped)	104	Marcrescent	151	Ovary	121
Hypogynous	140	Mealy	173	Ovate	45
		Medullary rays and sheath	198	Ovoid	54
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Imperfect	84	Midrib	40	Palate	105
Incomplete	84	Monadelphous	113	Palea, paleæ	82
Indefinite	92	Monandrous	112	Paleaceous = of a chaffy consistence.	
Indehiscent	156	Moniliform	54	Palmate	41, 42
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Induplicate	102	Monocarpic	12	Papillæ	122
Inferior	140	Monochlamydeous . .	85	Pappus	155
Inferior radicle	167	Monocotyledonous plants	167	Parallel veins	40
Inflorescence	66	Monceious	86	Parasite	14
Infundibuliform (funnel- shaped)	104	Monogynous	125	Parenchyma	188
Innate anther	114	Monopetalous	100	Parietal	132
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Internode	31	Mucronate	47	Pedate	41, 42
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Introrse	118	Muricate	173	Pedicef	70
Involucre, involucl . .	79			Pedicellate = on a pedicel.	
Involute	102	Naked	85, 161	Peduncle	68
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		Navicular = boat-shaped.		Penicillate	130
Joint, joining	54	Nectary	138	Penta- (5 in composition)	92
Jugum, juga = pairs . .	44	Nerve	40		

	PAR.
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Pericarp	154
Perigynous	140
Perisperm	162
Persistent	146
Personate	105
Petal	90
Petiole	35
Petiolute	39
Phænogamous, phanero- gamous	10
Phyllaries	79
Phyllodium=a flat petiole with no blade.	
Pilose	173
Pinna	43
Pinnate	41, 42
Pinnatifid, pinnatisect	42
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Pistillate	85
Pith	198
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Plant	6
Plicate	102
Plumose	172
Plumule	166
Pluri- =several, in com- position.	
Plurilocular	126
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Polyandrous	92, 112
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Polypetalous	100
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Primine	133
Procumbent	28
Proliferous	17
Prosenchyma	188
Prostrate	28
Protoplasm	191
Pubescent, puberulent	173

	PAR.
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Punctiform=like a point or dot.	
Putamen	157
Pyramidal	54
Quadri- (4 in composi- tion)	44
Quincuncial	102
Quinque- (5 in composi- tion)	44
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Ribbed	173
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Rosulate	38
Rotate	104
Rudimentary	84
Rugose	173
Runcinate	41
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Sagittate	50
Salver-shaped	104
Samara	158
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Sarcocarp	157
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Scaly surface	172
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	PAR.
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Scattered	32
Scion	30
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Secund	32
Secundine	123
Seed	161
Segment	39
Sepals	90
Septem- (7 in composi- tion)	44
Septicidal	158
Septum=partition	126
Serrate, serrulate	39
Sessile	37
Seta, setæ (bristles)	173
Setaceous (bristle-like)	54
Setose (bearing bristles)	173
Sex- (6 in composition)	44
Sheathing	37
Shrubs	12
Silicule, siliqua	160
Silver grain	198
Simple	39
Sinuate	39
Sinus	39
Smooth	173
Spadix	76
Spatha	81
Spatulate	45
Species	177
Specimen	225
Spherical	54
Spike, spicate	74
Spikelet	76
Spinous	170
Spiral vessels	188
Spur, spurred	105
Squamæ=scales	58
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Stamens	15, 90, 108, 203
Staminate	85
Staminodia	110
Starch	192
Stellate	104
Stellate hairs	172
Stem	15, 28, 197, 210, 217
Stem-clasping	37
Sterile	85
Stigma	121
Stipella	64
Stipes, stipitate	65
Stipules	63
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Stole, stolon	23, 30
Stomates	194
Stone, stone-fruit	157

	P.A.R.		P.A.R.		P.A.R.
Striate	173	Thyrus, thyrsoïd . . .	74	Uni- (1 in composition) .	44
Strigose, strigillose . .	173	Tissues (elementary) . .	186	Unilateral (one-sided) ra-	
Strophiole, strophiolate .	164	Tomentose	173	cemes	74
Style	121	Toothed	39	Unilocular	126
Sub= <i>almost</i> , or <i>under</i> in		Torus	135	Unisexual	86
composition.		Trees	12	Unsymmetrical	94
Subclass, suborder . . .	182	Tri- (3 in composition) .	44, 92	Upper	91
Submerged= <i>under water</i> .		Tribe	182	Urceolate	104
Subulate	54	Trichotomous	33	Utricle	158
Succulent	55	Trifid	41		
Succulent fruits	157	Trifoliate	41	Valvate	102
Sucker	30	Trigonous	54	Valves	158
Suffrutescent, suffruticose	12	Tripinnate	43	Variety	178
Sugar	192	Triplinerved	40	Vascular tissue	188
Sulcate	173	Triquetrous	54	Vegetable Anatomy . .	8, 186
Superior	140	Tristichous	32	Vegetable Chemistry . .	8
Superior radicle	167	Truncate	47	Vegetable Homology or	
Superposed= <i>inserted one</i>		Trunk	12	Metamorphosis . . .	8, 88
<i>above the other</i> .		Tube	101, 104	Vegetable Physiology .	8, 207
Suture	159	Tuber, tuberous	20, 25, 204	Veins, veinlets, venation	40
Symmetrical	89	Tuberculate	173	Vernation	57
Synandrous	112	Tubular	104	Versatile anther	114
Syncarpous	125	Tufted	28	Verticil, verticillate . .	32
Syngenesious	113	Tunicated bulb	27	Vessels	188
Systematic Botany (p. xxxvi.)		Turbinate= <i>top-shaped</i> .	54	Virgate= <i>twiggy</i>	28
		Twiner	29	Viscid, viscous	173
Taproot	20	Twisted	102	Vitta, vittæ	175
Teeth	39, 101	Type, typical	181	Viviparous	17
Tegmen	163			Voluble	29
Tendril	29, 169	Umbel, umbellate, um-			
Terete	54	bellule	33, 74	Wart, warted	173
Ternate	32, 41	Umbilicate	173	Wavy	39
Terrestrial= <i>growing on</i>		Umbonate	173	Whorl, whorled	32
<i>the earth</i>	14	Uncinate= <i>hooked</i> .		Wing, winged	37, 155
Testa	163	Undershubs	12	Wood	198
Tetra (4 in composition) .	92	Undulate	39	Woody tissue	188
Tetradynamous	113	Unequally pinnate . . .	43	Wool, woolly	173
Thorns	170	Unguiculate	107		
Throat	104	Unguis (claw)	107		

III.—ARRANGEMENT OF THE TEXT, AND ABBREVIATIONS USED IN THE PRESENT WORK.

In the following pages the name of each *Family* or *Order* (for the two words may be indiscriminately used) is given in English and in Latin. The English name is always in two words, exclusive of the particle. Where the first word is not the name of a genus also, it may be used alone to designate the family by putting it in the plural, as *Crucifers* for the *Crucifer family*, *Waterlilies* for the *Waterlily family*. Where however it is also the name of a genus, and it is wished to designate the family by a single word, in order to avoid confusion, either the Latin name must be taken, or it must be Anglicized by some of the modes which have been proposed, such as substituting the terminations *ids* for *ideæ*, and *anths* or *ads* for *aceæ*, as : *Orchids* for *Orchideæ*, *Ranunculanth*s for *Ranunculaceæ*.

After the name of the family, the first paragraph, in large type, is the *character* of the family ; the second, in ordinary type, contains remarks on its geographical distribution and affinities.

This is followed, in small type, by the analytical key of the British genera belonging to the Order, as above explained, p. 30 ; and short memoranda are occasionally subjoined on commonly cultivated plants belonging to exotic genera.

Each genus commences with the name, in English on the left, in Latin on the right. Where there is no English name suitable for the genus, the Latin one is repeated, as it must in that case be used as English.

Then follow the generic character, a paragraph of remarks, an analytical key of species, and occasional memoranda on exotic cultivated species, all in the same form as in the case of the families.

Each species commences with the name, consisting, both in English and in Latin, of two words. In English, the first word indicates the species, the second the genus ; but *both* must be used in naming the plant, excepting in a few cases where the first word is a popular name applied to no other plant : the generic name may then, for ordinary purposes, be dispensed with, as : *Charlock Brassica* may be called simply *Charlock*. In Latin, the first word indicates the genus, the second the species ; and the name is generally followed by the indication, in abbreviation, of the botanist who first fixed the name for the species in question. In these abbreviations, *Linn.* stands for *Linnaeus* ; *Br.* for *Robert Brown* ; *DC.* for *De Candolle* ; *Sm.* for *Sir James Smith*. Other names are usually abbreviated by giving the first syllable with the first letter of the second syllable, as *Hook.* for *Hooker*.

After the name is a parenthesis, in which reference is given to the plate in Smith and Sowerby's 'English Botany' where the species is figured, and to any name, different from the one here adopted, under which the species may be described in the English Botany, in Hooker and Arnott's 'British Flora,' or in Babington's 'Manual of British Botany.' Thus, under the *Lesser Thalictrum*, "(Eng. Bot. t. 11 ; *T. majus*, Eng. Bot. t. 611 ; and *T. flexuosum*, Bab. Man.)" means, that the species is figured under the name here adopted (*Thalictrum minus*) at plate 11 ; that what is here considered as the same species includes the plant figured plate 611 of that work under the name of *Thalictrum majus*, and the plant described in Babington's Manual, under the name of *Thalictrum flexuosum*. So under the *Yellow Corydal*, or *Corydalis lutea*, the reference

“(*Fumaria*, Eng. Bot. t. 588)” means, that the species is figured in ‘English Botany’ under the name of *Fumaria lutea*, the specific name not being different is not repeated in the reference. In these *synonyms*, as such references are commonly called, Hooker and Arnott’s ‘British Flora’ is designated by the abbreviation *Brit. Fl.* The references to ‘English Botany’ repeated from the former edition of the Handbook were retained in the early numbers of the present one chiefly as synonyms, and have been continued for the sake of uniformity, although their utility has been much diminished, as well by the figures of every species now introduced into our text, as by the new edition of ‘English Botany’ now publishing, in which the plants are systematically arranged. Popular names of the species are also included in the same parenthesis.

The synonyms are followed by a paragraph describing the species. In these descriptions it will be observed that when another species of *the same genus* is referred to, the generic name is, for shortness, indicated by its initial letter, and the specific one is printed in italics, to avoid confusion with a descriptive epithet. Thus under the *Yellow Thalictrum*, “fewer than in the *lesser T.*” means, fewer than in the species called the *Lesser Thalictrum*.

The next paragraph contains: 1st, The indication of the geographical area of the species. This has only been done in a very general manner, and more especially with regard to its distribution in countries the nearest to Britain; for it would have been quite foreign to the purpose of this work to attempt to fix, with any precision, the limits of the areas remote from Britain. Generally speaking, the species indicated as extending to southern Europe penetrate more or less into Africa: if reaching the Caucasus, they often advance more or less into Persia and Arabia, etc. 2ndly, The distribution in Britain. These are also given in general terms, the object being to give the reader some indication whether the species to which he refers the plant he has been examining, is likely to have been growing in the place where he found his specimen. Directions to precise localities occupy too much space for any but very local Floras, or Botanists’ Guide-books. Exceptions are of course made for plants only known in a single locality. In all these indications *Britain* is meant to include Ireland. The Channel Island plants are only mentioned when they are not also found on the main British Isles.

These *stations* are followed, in the same paragraph, by the period of flowering, printed in italics. The season is generally given rather than the month, as the flowering of plants always varies with the season. A spring flower which may appear in the beginning of March in a favoured situation on the south coast of England, may not open till May in the Highlands of Scotland. These periods of flowering, derived from personal observation or from the best sources I had at hand, must however be taken with considerable allowance, for they are liable to much variation, according to local or temporary influences; and at any rate they can never be depended on for specific distinctions. In general, spring flowers may be said to blow in March, April, or May, in the south of England; summer flowers in June, July, or part of August; autumnal ones in the end of August, September, or part of October. After the middle of October, and until the beginning of March, there are but few besides occasional stragglers in flower: towards the North, the flowering season is much shorter, and particularly the early flowers open later.

Observations on varieties, etc., are reserved for the conclusion of the paragraph. The plants described as species in the ‘British Flora,’ or in the ‘Manual of British Botany,’ and not adopted as such in the present work, are mentioned or referred to either in these concluding observations or among the synonyms immediately under the specific name. All other species inserted in the above works and not included or alluded to in the present one, are omitted, because they are believed not to grow wild in the British Isles.

IV.—ANALYTICAL KEY

To the Natural Orders and Anomalous Genera of the British Flora.

The heads of division adopted in the following Key are necessarily artificial, being solely intended to assist the beginner in finding out the name of his plant, and its place in the system, like the letters of the alphabet in an index. They are not classes or groups of Orders, for the same Order will be found repeated under different heads. At the same time, it has been the endeavour so to frame them as to call the student's attention to some of the most prominent characters of the great natural divisions.

I. FLOWERING PLANTS.

- | | | | |
|---|---|---|--------------------------|
| 1 | { | Flowers compound, consisting of several florets in a common involucre, without separate calyces. Anthers united in a cylinder round the style | 2 |
| | { | Flowers distinct, or if in a head, having the anthers free | 3 |
| 2 | { | Ovary and fruit containing a single seed, and appearing like a seed under the floret | COMPOSITE Fam. (p. 407.) |
| | { | Ovary and fruit two-celled, with several seeds | JASIONE Gen. (p. 507.) |
| 3 | { | Perianth double, consisting of a calyx (sometimes reduced to a scarcely prominent ring) and a corolla | 4 |
| | { | Perianth single (its segments all calyx-like or all petal-like) or none | 85 |
| 4 | { | Corolla consisting of several distinct petals | 5 |
| | { | Corolla of one piece, the petals united, at least at the base | 8 |
| 5 | { | Ovary free, within or above the petals | 6 |
| | { | Ovary inferior, adherent to the base of the calyx, and below the petals | 46 |
| 6 | { | Ovaries several in the same flower, the carpels distinct or deeply divided | 9 |
| | { | Ovary solitary (simple or compound) entire or slightly divided | 7 |
| 7 | { | Corolla regular, the petals equal and similar to each other | 15 |
| | { | Corolla irregular | 41 |
| 8 | { | Ovary inferior or adherent, below the insertion of the corolla | 51 |
| | { | Ovary superior or free, within the tube or base of the corolla | 57 |

Polypetals with several free, distinct ovaries or carpels.

- | | | | |
|----|---|--|-------------------------|
| 9 | { | Stamens united in a ring or column enclosing the style. Ovaries in a ring round the axis | 10 |
| | { | Stamens free. Ovaries quite free, each with a distinct style or stigma, without a central axis | 11 |
| 10 | { | Stamens 5 or 10, shortly united at the base. | GERANIUM Fam. (p. 158.) |
| | { | Stamens indefinite, united in a column | MALLOW Fam. (p. 151.) |
| 11 | { | Stamens definite in number (as many, twice, or thrice as many as the petals) | 12 |
| | { | Stamens indefinite | 13 |
| 12 | { | Leaves fleshy. Sepals and petals 4 or more | CRASSULA Fam. (p. 291.) |
| | { | Aquatic plants not fleshy. Sepals and petals 3. | ALISMA Fam. (p. 793.) |
| 13 | { | Leaves without stipules. Stamens inserted on the receptacle | 14 |
| | { | Leaves with stipules. Stamens on the calyx | ROSE Fam. (p. 234.) |
| 14 | { | Sepals or petals, or both, 4 or more | RANUNCULUS Fam. (p. 1.) |
| | { | Sepals and petals, 3 each | ALISMA Fam. (p. 793.) |

Regular Polypetals with one free, simple, or compound ovary.

15	{ More than 10 stamens	16
	{ 10 stamens or fewer	22
	{ Calyx of 2 distinct sepals. Petals 4	POPPY <i>Fam.</i> (p. 28.)
	{ Calyx of one piece, with 5 or more teeth. Petals 5 or 6. Stamens	
	about 12	17
16	{ Calyx of 3 to 5 sepals or lobes. Petals 5. Stamens numerous	18
	{ Calyx of several sepals. Petals and stamens numerous. Aquatic	
	plants	WATERLILY <i>Fam.</i> (p. 26.)
	{ Petals distinct. Ovary sessile	LYTHRUM <i>Gen.</i> (p. 287.)
17	{ Apparent petals really appendages to the involucre. Ovary appa-	
	rently stalked	SPURGE <i>Gen.</i> (p. 727.)
18	{ Leaves opposite	19
	{ Leaves alternate	20
	{ Sepals 3, with or without two small outer ones. Style simple.	
19	{	CISTUS <i>Fam.</i> (p. 91.)
	{ Sepals 5, nearly equal. Styles 3 or 5, distinct. HYPERICUM <i>Fam.</i> (p. 139.)	
	{ Trees or shrubs. Stamens free	21
20	{ Herbs. Stamens free	BANEERRY <i>Gen.</i> (p. 24.)
	{ Herbs or undershrubs. Stamens united in a column round the pistil.	
	. . . . .	MALLOW <i>Fam.</i> (p. 151.)
	{ Petals and stamens inserted on the receptacle. Flower-stalk winged	
21	by an oblong bract	LIME <i>Fam.</i> (p. 157.)
	{ Petals and stamens inserted on the calyx. Flower-stalk not winged.	
	. . . . .	ROSE <i>Fam.</i> (p. 234.)
22	{ Leaves opposite	23
	{ Leaves alternate, or radical, or none	30
23	{ Trees or shrubs	24
	{ Herbs	25
	{ Stamens 2. Leaves pinnate	ASH <i>Gen.</i> (p. 554.)
24	{ Stamens 4 or 5. Leaves ovate, toothed	CELASTRUS <i>Fam.</i> (p. 177.)
	{ Stamens about 8. Leaves broadly lobed or angular. MAPLE <i>Gen.</i> (p. 175.)	
	{ Petals inserted on the tubular calyx, near the top.	
25	{	LYTHRUM <i>Fam.</i> (p. 287.)
	{ Petals inserted within the base of the calyx	26
26	{ Leaves divided, cut, or toothed	GERANIUM <i>Fam.</i> (p. 158.)
	{ Leaves quite entire	27
	{ Capsule one-celled, with a central placenta and several seeds.	
	. . . . .	PINK <i>Fam.</i> (p. 100.)
27	{ Capsule with a single seed	PARONYCHIA <i>Fam.</i> (p. 685.)
	{ Capsule and ovary divided into several cells	28
	{ Petals 3 or 4, with twice as many stamens. Flowers very minute.	
	. . . . .	ELATINE <i>Gen.</i> (p. 138.)
28	{ Petals 4 or 5. Stamens the same, or rarely one or 2 additional	
	ones	29
	{ Calyx tubular, five-toothed	FRANKENIA <i>Gen.</i> (p. 100.)
29	{ Calyx many-toothed. Flowers very small	RADIOLA <i>Gen.</i> (p. 151.)
	{ Sepals 5, quite free	Cathartic FLAX (p. 150.)
	{ Trees or shrubs	31
30	{ Low procumbent heath-like undershrub, with 3 petals and stamens.	
	. . . . .	CROWBERRY <i>Gen.</i> (p. 738.)
	{ Herbs rarely slightly woody at the base	34
	{ Petals and stamens 6. Berry one- or two-seeded.	
31	{	BARBERRY <i>Gen.</i> (p. 26.)
	{ Petals 4 or 5. Stamens as many, or twice as many	32

- 32 { Branches twiggy, with small green scale-like leaves. Capsule one-celled. Seeds cottony TAMARISC *Gen.* (p. 137.)
 { Shrubs or trees, with flat leaves. Ovary and fruit (usually a berry) divided into cells 33
 { Petals white, alternating with the stamens HOLLY *Gen.* (p. 552.)
 33 { Petals very small, green and behind the stamens, or none. BUCKTHORN *Gen.* (p. 178.)
 34 { Petals 4 35
 { Petals 5 36
 { Leafless herbs, with brown scales. Stamens 8. MONOTROPE *Gen.* (p. 534.)
 35 { Herbs with entire or divided leaves. Stamens 6, of which two are shorter, or rarely wanting CRUCIFER *Fam.* (p. 38.)
 { Herb with compound leaves. Stamens 4. EPIMEDE *Gen.* (p. 26.)
 36 { Stamens 10 37
 { Stamens 5 38
 { Style single, with a broad stigma. Leaves entire or minutely toothed. WINTERGREEN *Gen.* (p. 531.)
 37 { Two styles or two distinct stigmas. Leaves often toothed or divided. SAXIFRAGE *Gen.* (p. 304.)
 { Five styles. Leaves of three leaflets OXALIS *Gen.* (p. 171.)
 38 { Leaves all radical, or only one on the stem 39
 { Stem-leaves several, entire 40
 { Styles 3 to 5, each one deeply divided. Leaves fringed with glandular hairs SUNDEW *Gen.* (p. 315.)
 39 { Stigmas 4, sessile. Leaves broad, entire, one on the stem. PARNASSIA *Gen.* (p. 314.)
 { Styles 5. Leaves all radical, entire PLUMBAGO *Fam.* (p. 677.)
 { Styles 3. Procumbent plant, with very small white and green flowers. CORRIGIOLE *Gen.* (p. 686.)
 40 { Styles 5. Flowers blue FLAX *Gen.* (p. 148.)

Irregular Polypetals with one free, simple, or compound ovary.

- 41 { Flowers with a spur or pouch at the base 42
 { Flowers not spurred 44
 { Stamens numerous LARKSPUR *Gen.* (p. 22.)
 42 { Stamens 6, united in two clusters FUMITORY *Fam.* (p. 35.)
 { Stamens 5 43
 { Sepals 5. Petals 5, spreading, one of them spurred. VIOLET *Gen.* (p. 94.)
 43 { Outer sepals 2. One inner sepal, large, hooded, and spurred. Petals one outer, entire, 2 inner lobed BALSAM *Gen.* (p. 172.)
 { Petals small, deeply cut. Stamens more than 8, free. MIGNONETTE *Gen.* (p. 88.)
 { Petals 5, papilionaceous. Stamens 10, all or 9 united. PEAFLOWER *Tribe* (p. 180.)
 44 { Petals and sepals in pairs or in fours. Stamens 6 45
 { Sepals 5, of which 2 are large. Petals 3 or 5, small. Stamens 8, united in two clusters MILKWORT *Gen.* (p. 98.)
 { Petals 4, spreading, 2 large and 2 small. Stamens free. CRUCIFER *Fam.* (p. 38.)
 45 { Petals 4, small, erect in two pairs. Stamens united in two clusters. FUMITORY *Fam.* (p. 35.)

Polypetals with an inferior ovary.

- 46 { Stamens 10 or fewer, of the same number or twice the petals . . . 47
 { Stamens 12 LYTHRUM *Gen.* (p. 287.)
 { Stamens indefinite, usually numerous 50
 { Petals 5. Stamens 10 SAXIFRAGE *Gen.* (p. 304.)
 { Petals 5. Stamens 5 48
 47 { Petals 3. Aquatic plants with diclinous flowers.
 { HYDROCHARIS *Fam.* (p. 801.)
 { Petals 2 or 4. Stamens 2, 4, or 8 49
 { Herbs. Fruit separating into two dry one-seeded carpels.
 { UMBELLATE *Fam.* (p. 318.)
 48 { Shrubs. Fruit a berry, with several seeds RIBES *Gen.* (p. 300.)
 { Evergreen climber. Fruit a berry, with 2 to 5 seeds.
 { IVY *Gen.* (p. 373.)
 49 { Fruit a berry. Shrubs or herbs CORNEL *Gen.* (p. 376.)
 { Fruit dry, capsular. Herbs CENOTHERA *Fam.* (p. 273.)
 { Calyx of 2 sepals PURSLANE *Fam.* (p. 135.)
 50 { Calyx of 4, 5, or twice that number of teeth or divisions.
 { ROSE *Fam.* (p. 234.)

Monopetals with an inferior ovary.

- 51 { Leaves alternate or radical 52
 { Leaves opposite or whorled 54
 { Shrubs. Stamens 8 or 10. Fruit a berry. VACCINIUM *Gen.* (p. 518.)
 { Climber. Flowers diceious. Stamens 5, combined into 3. Fruit
 { a berry BRYONY *Gen.* (p. 290.)
 52 { Herb with ternately divided leaves. Stamens 8 or 10. Fruit a berry.
 { MOSCATEL *Gen.* (p. 378.)
 { Herbs. Stamens 5. Fruit a capsule 53
 { Stamens inserted within the base of the corolla.
 53 { CAMPANULA *Fam.* (p. 505.)
 { Stamens inserted in the tube of the corolla. Flowers small, white.
 { SAMOLE *Gen.* (p. 547.)
 54 { Leaves in whorls of four or more STELLATE *Tribe* (p. 385.)
 { Leaves opposite 55
 55 { Stamens 1, 2, or 3 VALERIAN *Fam.* (p. 396.)
 { Stamens 4 or 5 56
 { Flowers numerous, in heads, with a common involucre. Fruit dry,
 { one-seeded. Stem herbaceous TEASEL *Fam.* (p. 403.)
 56 { Flowers distinct or few together, without a common involucre. Fruit
 { often succulent. Stem usually shrubby or climbing.
 { HONEYSUCKLE *Fam.* (p. 378.)

Monopetals with a free ovary.

- 57 { Stamens twice as many as the lobes of the corolla 58
 { Stamens equal in number to the lobes of the corolla or fewer . . . 61
 58 { Flowers regular. Stamens distinct 60
 { Flowers very irregular. Stamens united 59
 { Leaves much divided FUMITORY *Fam.* (p. 35.)
 59 { Leaves with 3 leaflets CLOVER *Gen.* (p. 196.)
 { Leaves entire MILKWORT *Gen.* (p. 98.)
 { Ovary single, of several cells. Leaves not peltate. HEATH *Fam.* (p. 517.)
 60 { Ovaries several, distinct. Radical leaves, peltate, fleshy.
 { COTYLEDON *Gen.* (p. 292.)

- 61 { Ovaries divided into two or four, resembling naked seeds in the bottom of the calyx, with the style arising from between them . . . 62
 { Ovary entire, of one or more cells, the style or stigma at the top . . . 63
 { Leaves all opposite. Corolla two-lipped, or seldom nearly regular. LABIATE Fam. (p. 640.)
- 62 { Leaves alternate (except sometimes the floral ones). Corolla regular or rarely oblique BORAGE Fam. (p. 573.)
- 63 { Corolla regular 64
 { Corolla irregular 80
- 64 { Stamens opposite the lobes of the corolla, and of the same number. PRIMROSE Fam. (p. 535.)
 { Stamens alternating with the lobes of the corolla, or fewer in number 65
 { Stamens 2. Leaves opposite 66
 { Stamens 3. Small herb, with minute white flowers. MONTIA Gen. (p. 136)
- 65 { Stamens 4 67
 { Stamens and divisions of the corolla 5 or more 72
- 66 { Trees or shrubs JESSAMINE Fam. (p. 553.)
 { Herb. Corolla rotate VERONICA Gen. (p. 621.)
 { No leaves. Stems thread-like, adhering to other plants. DODDER Gen. (p. 571.)
- 67 { Leaves alternate or radical 68
 { Leaves opposite 71
- 68 { Shrubs with evergreen leaves HOLLY Gen. (p. 552.)
 { Herbs 69
 { Corolla scarious, deeply four-lobed. Stamens longer than the corolla.
- 69 { PLANTAIN Fam. (p. 681.)
 { Corolla of the consistence of petals. Stamens shorter than the corolla 70
- 70 { Leaves narrow, entire LIMOSEL Gen. (p. 618.)
 { Leaves orbicular, crenate SIBTHORPIA Gen. (p. 619.)
- 71 { Leaves entire GENTIAN Fam. (p. 558.)
 { Leaves toothed or cut VERVEIN Gen. (p. 676.)
- 72 { Fruit a berry 73
 { Fruit a capsule 74
- 73 { Shrubs with evergreen leaves HOLLY Gen. (p. 552.)
 { Stem or branches herbaceous SOLANUM Fam. (p. 591.)
- 74 { Leaves opposite, entire 75
 { Leaves alternate, or none 76
 { Trailing plants, with evergreen leaves. Two ovaries joining at the top into one style PERIWINKLE Gen. (p. 556.)
- 75 { Small procumbent shrub, with very small evergreen leaves. Ovary single LOISELEURIA Gen. (p. 524.)
 { Herbs. Ovary single GENTIAN Fam. (p. 558.)
- 76 { Leaves divided 77
 { Leaves undivided or none 78
 { Leaves of three leaflets. Corolla hairy within. Aquatic plant. BUCKBEAN Gen. (p. 565.)
- 77 { Leaves pinnately cut. Corolla smooth. Erect herb. POLEMONIUM Gen. (p. 567.)
 { Aquatic plant with floating orbicular leaves. LIMNANTH Gen. (p. 566.)
- 78 { Twining or procumbent plants. Corolla campanulate. Seeds 2 or 4 in each capsule CONVULVULUS Fam. (p. 568.)
 { Tall erect plants. Seeds numerous 79
 { Corolla nearly rotate, the upper lobes overlapping the lower ones. MULLEIN Gen. (p. 604.)
- 79 { Corolla campanulate, or with a distinct tube, the lobes folded in the bud. SOLANUM Fam. (p. 591.)

- 94 { Stamens more than 6 95
 { Stamens 6 or fewer 102
 { Stamens indefinite, usually numerous 96
 95 { Stamens about 12 97
 { Stamens 7 to 10 98
 { Stamens inserted on the receptacle. Ovaries numerous.
 96 { RANUNCULUS *Fam.* (p. 1.)
 { Stamens on the calyx. Ovaries few or single . . . ROSE *Fam.* (p. 234.)
 { Perianth three-lobed. Capsule sessile . . . ASARUM *Gen.* (p. 726.)
 97 { Perianth (involucre) with five small lobes or teeth. Capsule stalked.
 SPURGE *Gen.* (p. 727.)
 98 { Leaves radical, or in a single whorl on the stem 99
 { Leaves alternate or opposite 100
 { Leaves once or twice ternately divided. Flowers in a small terminal
 head MOSCATEL *Gen.* (p. 378.)
 99 { Leaves entire, rush-like, radical. Flowers in a terminal umbel. Plant
 aquatic BUTOME *Gen.* (p. 794.)
 { Leaves entire, in a single whorl of four or five. Flowers solitary, ter-
 minal PARIS *Gen.* (p. 844.)
 { Leaves orbicular, crenate. Capsule inferior, many-seeded.
 CHRYSOSPLENE *Gen.* (p. 313.)
 100 { Leaves entire. Capsule several-seeded PINK *Fam.* (p. 100.)
 { Leaves entire. Capsule one-seeded 101
 101 { Leaves small, opposite. Capsule inferior. SCLERANTH *Gen.* (p. 688.)
 { Leaves alternate, with sheathing stipules. POLYGONUM *Gen.* (p. 714.)
 102 { Perianth coloured, and looking like a corolla 103
 { Perianth herbaceous, and looking like a calyx or scales, or entirely
 wanting 111
 { One or two anthers sessile on a central column or style. One of the
 six divisions of the perianth different from the others.
 103 { ORCHID *Fam.* (p. 803.)
 { Three to six stamens distinct from the style 104
 104 { Leaves opposite or in whorls 105
 { Leaves alternate or radical 107
 { Stamens 6. Capsule two-celled, with several seeds. PEPLIS *Gen.* (p. 289.)
 105 { Stamens 5 or fewer. Ovary inferior 54
 { Stamens 5. Ovary superior 106
 { Capsule one-seeded. Stigmas small, scarious.
 106 { PARONYCHIA *Fam.* (p. 685.)
 { Capsule several-seeded, one-celled. No stipules GLAUX *Gen.* (p. 544.)
 107 { Leaves pinnate, with stipules SANGUISORB *Gen.* (p. 258.)
 { Leaves pinnate or divided, without stipules. UMBELLATE *Fam.* (p. 318.)
 { Leaves entire 108
 { Stipules forming sheaths or rings round the stem. Nut superior,
 one-seeded POLYGONUM *Fam.* (p. 705.)
 { No stipules 109
 108 { Stamens and divisions of the flower 4 or 5 110
 109 { Stamens and divisions of the flower 3 or 6. Leaves with parallel
 veins 154
 110 { Styles 5. Ovary and capsule superior . . . PLUMBAGO *Fam.* (p. 677.)
 { Styles 2. Ovary inferior UMBELLATE *Fam.* (p. 318.)
 { Style 1. Ovary inferior THESIUM *Gen.* (p. 724.)
 { Leaves opposite or whorled 112
 111 { Leaves alternate or radical 117
 { Fleshy, articulate, maritime plants, without leaves. Stamens 1 or 2.
 SALICORN *Gen.* (p. 691.)

- 112 { Leaves linear, whorled. Stamen 1. . . . MARESTAIL *Gen.* (p. 285.)
 { Leaves opposite. Stamens 4, 5, or 6 113
 113 { Ovary and capsule one-seeded 114
 { Ovary and capsule several-seeded 115
 114 { Leaves small, with scarious stipules . . . PARONYCHIA *Fam.* (p. 685.)
 { No stipules GOOSEFOOT *Fam.* (p. 690.)
 115 { Ovary inferior. Stamens 4 LUDWIGIA *Gen.* (p. 281.)
 { Ovary superior 116
 { Calyx 6-toothed. Stamens 6. Capsule 2-celled. PEPLIS *Gen.* (p. 289.)
 { Calyx five-lobed. Stamens 5. Capsule one-celled, several-seeded.
 116 { GLAUX *Gen.* (p. 544.)
 { Calyx of 4 or 5 sepals. Stamens 4 or 5. Capsule 1-celled, several-
 { seeded PINK *Fam.* (p. 100.)
 { Flowers glumaceous, consisting of chaffy scales alternating with each
 { other, enclosing the stamens. Leaves linear. Stamens 2 or 3 . 165
 117 { Perianth entire, oblique, projecting on one side into a lip. Stamens 6
 { ARISTOLOCHIA *Fam.* (p. 726.)
 { Perianth 4-, 5-, or 6-merous. Stamens 4, 5, or 6 118
 118 { Two or more ovaries ROSE *Fam.* (p. 234.)
 { A single ovary 119
 119 { Perianth of 4 or 5 parts or teeth. Stamens usually 4 or 5 . . . 120
 { Perianth of 6 divisions. Stamens 6 124
 120 { Ovary inferior THESPIUM *Gen.* (p. 724.)
 { Ovary superior 121
 121 { Seeds several in the capsule PLANTAIN *Gen.* (p. 681.)
 { Seeds solitary 122
 { Stipules leafy. Leaves broadly lobed or divided . ROSE *Fam.* (p. 234.)
 122 { Stipules membranous, sheathing the stem . POLYGONUM *Fam.* (p. 705.)
 { Stipules minute or none 123
 123 { Stamens 4 PELLITORY *Gen.* (p. 743.)
 { Stamens 5 GOOSEFOOT *Fam.* (p. 690.)
 { Stem leafy. Stipules sheathing. Nut enclosed in three of the pe-
 124 { rianth-lobes DOCK *Gen.* (p. 706.)
 { Leaves linear, mostly radical. Capsule with 3 or more seeds . . 161
 { Stamens and pistils in distinct globular or cylindrical masses without
 { separate perianths 166
 125 { Stamens about 12, with one pistil in a calyx-like involucre.
 { SPURGE *Gen.* (p. 727.)
 { Flowers, male or female, each with a distinct perianth 126
 { Stems long and climbing 127
 126 { Stems parasitical on trees, with hard green forked branches.
 { MISTLETOE *Gen.* (p. 375.)
 { Stems terrestrial or aquatic, but neither climbing nor floating . . 129
 { Leaves opposite. Capsules in a head concealed by leafy bracts.
 127 { HOP *Gen.* (p. 744.)
 { Leaves alternate. Berries red 128
 { Leaves angular or lobed. Stem climbing by tendrils. Perianth 5-lobed.
 128 { BRYONY *Gen.* (p. 290.)
 { Leaves entire, shining. Stem twining, without tendrils. Perianth 6-lobed.
 { TAMUS *Gen.* (p. 841.)
 129 { Flowers glumaceous, consisting of chaffy scales enclosing the stamens 165
 { Flowers of both sorts, or at least the males, with a distinct perianth,
 { of 3, 4, or more divisions 130
 130 { Male and female flowers on the same plant 132
 { Male and female flowers on separate plants 131

- 131 { Flowers all male 132
 { Flowers all female 140
 132 { Male perianth of 3 to 5 divisions 133
 { Male perianth of 6 divisions 139
 133 { Stamens as many as the divisions of the perianth 134
 { Stamens indefinite 138
 134 { Male flowers in globular heads in a terminal raceme. Females ax-
 { illary, joined two together in a large prickly burr, with incurved
 { points BURWEED *Gen.* (p. 456.)
 { Flowers, male and female, distinct, or in heads, not prickly . . . 135
 135 { Male perianth of 4 parts 136
 { Male perianth of 5 or 3 parts GOOSEFOOT *Fam.* (p. 690.)
 136 { Leaves all radical, linear and fleshy, or transparent. Marsh or water
 { plants 137
 { Stems leafy. Leaves flat NETTLE *Fam.* (p. 741.)
 137 { Male flowers one or two on a stalk, with very long stamens. Females
 { sessile LITTOREL *Gen.* (p. 685.)
 { Male and female flowers minute, mixed together in a small terminal
 { head ERIOCAULON *Gen.* (p. 883.)
 138 { Leaves opposite, simple MERCURY *Gen.* (p. 736.)
 { Leaves alternate, pinnate POTERIUM *Gen.* (p. 259.)
 { Leaves alternate, with sheathing stipules. Stamens 6. Nut enclosed
 { in the calyx DOCK *Gen.* (p. 706.)
 { Leaves small and fine, in tufts. Stamens 6. Fruit a berry.
 { ASPARAGUS *Gen.* (p. 849.)
 139 { Leaves small and heath-like. Stamens 3. Fruit a berry.
 { CROWBERRY *Gen.* (p. 738.)
 { Leaves radical, long, arrow-shaped. Stamens and carpels numerous.
 { Aquatic plant ARROWHEAD *Gen.* (p. 794.)
 { Perianth 2- or 4-cleft. Stigma sessile, tufted. Leaves opposite,
 { stinging NETTLE *Gen.* (p. 742.)
 140 { Perianth 3-cleft. Styles 2, simple. Leaves opposite, not stinging.
 { MERCURY *Gen.* (p. 736.)
 { Perianth 6-cleft, the 3 inner segments larger. Styles 3, with short
 { fringed stigmas. Leaves alternate or radical . . DOCK *Gen.* (p. 706.)
3. *Trees or Shrubs.*
- 141 { Leaves opposite 142
 { Leaves alternate or in tufts 145
 142 { Leaves divided, lobed or angular, deciduous 143
 { Leaves entire, evergreen 144
 { Leaves lobed or angular. Stamens about 8. Fruit with 2 diverging
 { wings MAPLE *Gen.* (p. 175.)
 143 { Leaves pinnate. Stamens in pairs, collected in clusters. Fruit with
 { one erect wing ASH *Gen.* (p. 554.)
 { Parasitical shrub with green dichotomous stems. Fruit a berry.
 { MISTLETOE *Gen.* (p. 375.)
 144 { Erect branching shrub with shining leaves. Fruit a few-seeded capsule.
 { BOX *Gen.* (p. 737.)
 { Male flowers in catkins, separated by scales only. Females solitary
 { or in clusters, or in catkins, usually different from the males . . 146
 { Flowers hermaphrodite or diclinous, each with a distinct perianth . 147
 146 { Leaves entire and mostly evergreen, needle-like, or narrow or scale-
 { like. Anthers sessile on the catkin-scales . . . PINE *Fam.* (p. 770.)
 { Leaves flat, mostly toothed. Stamens distinct from the scales.
 { CATKIN *Fam.* (p. 747.)

- 147 { Flowers diœcious. Male perianth of 2 or 6 scales 148
 Flowers hermaphrodite or polygamous. Perianth regular, of 3 to 5
 divisions 149
 Erect shrub. Male perianth of 2 scales . . . HIPPOPHAE *Gen.* (p. 723.)
 148 { Procumbent undershrub. Perianth of 6 scales.
 CROWBERRY *Gen.* (p. 738.)
 149 { Trees. Stamens opposite the lobes of the perianth. Fruit thin, like
 a small leaf ELM *Gen.* (p. 745.)
 Evergreen climber. Fruit a berry IVY *Gen.* (p. 373.)
 Shrubs. Fruit a berry 150
 150 { Flowers on the under side of the leaves . . . RUSCUS *Gen.* (p. 850.)
 Flowers on the stem or branches 151
 151 { Flowers very small, green and open. Stamens 4 or 5 alternating
 with the lobes of the perianth . . . BUCKTHORN *Gen.* (p. 178.)
 Flowers with a conspicuous tube, often coloured. Stamens 8.
 DAPHNE *Gen.* (p. 722.)

Monocotyledons.

- 152 { Perianth, or at least the inner segments, coloured and looking like a
 corolla, or, if green, soft and yellowish 153
 Perianth dry, green or brown, or reduced to mere scales, or none at
 all 159
 153 { One or two anthers sessile on a central column or style. One of
 the six divisions of the perianth different from the others.
 ORCHID *Fam.* (p. 803.)
 Threë or more distinct stamens 154
 154 { Ovaries several, quite distinct, or if cohering, each with a distinct
 style or stigma ALISMA *Fam.* (p. 793.)
 Ovary single, 3-celled 155
 155 { Ovary inferior 156
 Ovary superior LILY *Fam.* (p. 842.)
 156 { Floating or submerged plants HYDROCHARIS *Fam.* (p. 801.)
 Terrestrial or marsh plants 157
 157 { Stamens 3 IRIS *Fam.* (p. 831.)
 Stamens 6 158
 158 { Climbing plant with alternate net-veined leaves. TAMUS *Gen.* (p. 841.)
 Bulbous herbs AMARYLLIS *Fam.* (p. 837.)
 159 { Floating or submerged plants 86
 Terrestrial plants, or, if aquatic, erect from the bottom of the water
 and projecting above it 160
 160 { Leaves in a single whorl of 4 or 5, with netted veins. Perianth seg-
 ments, and stamens, 8 or 10 PARIS *Gen.* (p. 844.)
 Leaves radical or alternate, linear or cylindrical, with parallel veins . 161
 Perianth of 6 or 4 segments. Stamens as many or half as many . . 162
 161 { Flowers glumaceous, consisting of alternate chaffy scales, enclosing
 the stamens and pistil in the same or distinct scales 165
 Stamens and pistils in dense heads or spikes, without distinct pe-
 rianths 166
 162 { One style with 2 or 3 linear stigmas 163
 One ovary with 3 distinct styles or stigmas 164
 Three distinct ovaries SCHREUCHZERIA *Gen.* (p. 798.)
 163 { Flowers minute, unisexual, in a globular head.
 ERIOCAULON *Gen.* (p. 883.)
 Flowers complete, distinct, or clustered, or paniced.
 RUSH *Fam.* (p. 869.)

- 164 { Three short styles TOFIELDIA *Gen.* (p. 867.)
 { Three sessile stigmas TRIGLOCHIN *Gen.* (p. 799.)
 { Flowers with a single scale under each set of stamens and pistil.
 165 { Sheath of the leaves closed round the stem SEDGE *Fam.* (p. 884.)
 { Flowers enclosed in two or more scales. Sheath of the leaves split
 open on the side opposite the blade GRASS *Fam.* (p. 936.)
 { Fruit a berry. Leaves usually broad ARUM *Fam.* (p. 778.)
 166 { Fruit a dry nut. Leaves linear and sedge-like.
 BULRUSH *Fam.* (p. 775.)

II. CRYPTOGRAMS. (*No stamens or pistil.*)

- 1 { Plants with distinct roots and stems or rootstocks, with leaves or
 green branches 2
 { Plants variously shaped, without distinct roots, stems, and leaves, sel-
 dom green unless aquatic CELLULAR CRYPTOGRAMS (p. 1018.)
 2 { Fructification in terminal spikes 3
 { Fructification radical or in the axils of small leaves 4
 { Fructification on the back of the leaves or leaf-like branches.
 FERN *Fam.* (p. 1031.)
 { Stems leafless, jointed, simple, or with whorled branches.
 EQUISETUM *Gen.* (p. 1024.)
 3 { Stems bearing numerous small leaves CLUBMOSS *Gen.* (p. 1019.)
 { Stem bearing a simple or branched leaf below the spike.
 FERN *Fam.* (p. 1031.)
 4 { Capsules sessile CLUBMOSS *Fam.* (p. 1019.)
 { Capsules stalked 5
 5 { Capsules globular or urn-shaped, opening with a lid MOSSES (p. 1018.)
 { Capsules opening in valves HEPATICÆ (p. 1018.)

V.—ARRANGEMENT OF THE NATURAL ORDERS IN THE
PRESENT WORK.

The very unequal manner in which the several Natural Orders are represented in the British Isles, renders it impossible, in a work confined to British plants, to give any fair idea of the *subclasses* into which these Orders have been grouped, or of the principles which have guided the authors of the linear arrangement the most generally followed. The following recapitulation is therefore merely intended as a sort of table of contents, showing the order in which the families follow each other in the present work; at the same time that the attention is called to one or two of the most striking, the most important, or the easiest observed features of each one. These characters are however general, not always without exception, and sometimes specially applicable to British genera only.

CLASS I.—DICOTYLEDONS.

In the germination of the seed the plumula arises between two (rarely more) lobes or cotyledons of the embryo, or from a terminal notch.

Subclass I. THALAMIFLORES.—Petals distinct from the calyx, and from each other, seldom wanting. Stamens usually hypogynous or nearly so.

* *Ovary apocarpous.*

I. Ranunculus family. Petals definite. Stamens indefinite.

II. Barberry family. Perianth and stamens in twos or threes, or their multiples. Anthers opening by recurved valves.

III. Waterlily family. Aquatic plants with indefinite petals and stamens, the inner petals passing gradually into the outer stamens.

**** Ovary syncarpous. Placentas parietal (except in the Milkwort Family).**

IV. Poppy family. Perianth regular, in twos or fours. Stamens indefinite.

V. Fumitory family. Perianth very irregular, in twos or fours. Stamens 6, in two sets.

VI. Crucifer family. Sepals and petals 4 each. Stamens 6, of which 2 shorter.

VII. Mignonette family. Petals small, unequal, some divided. Stamens few but indefinite. Capsule open at the top before it is ripe.

VIII. Cistus family. Sepals 3, equal, or with additional small ones. Petals 5, regular. Stamens indefinite.

IX. Violet family. Stamens 5; the anthers on the inner face, of very short broad filaments, usually united in a ring. Capsule three-valved.

X. Milkwort family. Perianth very irregular. Stamens 8 in two parcels; petals united with them. Capsule 2-celled.

XI. Frankenia family. As in the Pink family, except the parietal placentas.

***** Ovary syncarpous. Placentas axile.**

XII. Pink family. Leaves opposite, entire. Flowers regular. Stamens definite. Capsule one-celled, with a free central placenta.

XIII. Purslane family. As in the Pink family but only 2 sepals and 5 or more petals.

XIV. Tamarise family. Shrubs with alternate green scale-like leaves. Flowers regular. Capsule one-celled. Seeds with a tuft of wool.

XV. Elatine family. As in the Pink family, but the capsule divided into cells.

XVI. Hypericum family. Leaves opposite. Flowers regular. Sepals imbricate. Flowers indefinite, in 3 or 5 clusters or bundles.

XVII. Flax family. Leaves entire. Petals convolute, distinct. Stamens definite. Capsule separating into carpels without leaving a central axis.

XVIII. Mallow family. Sepals valvate. Petals convolute, adhering at the base to the staminal tube. Stamens indefinite, monadelphous, with one-celled anthers.

XIX. Lime family. Trees. Sepals valvate. Petals free. Stamens indefinite.

XX. Geranium family. Leaves opposite, toothed or divided. Petals convolute. Stamens definite. Capsule with several cells and lobes round a persistent central axis.

(Balsam genus. Perianth very irregular. Stamens 5, the anthers cohering in a ring. Capsule opening elastically.)

XXI. Maple genus or tribe (of *Sapindaceæ*). Trees. Leaves opposite. Stamens definite, but seldom isomerous. Fruit separating into 2 (rarely 3) winged nuts.

Subclass 2. CALYCIFLORES.—Petals usually distinct, and stamens perigynous or epigynous.

** Stamens and petals mostly perigynous (except in the Enothera, Gourd, and Ribes families).*

XXII. Celastrus family. Shrubs or trees, with small regular green flowers. Stamens alternating with the petals, on a disk lining the base of the calyx.

XXIII. Buckthorn family. As in the Celastrus family, but the stamens are opposite the small concave or scale-like petals.

XXIV. Peaflower tribe (of the Leguminous family). Flowers very irregular, *papilionaceous*. Stamens 10, all, or 9 of them, combined. Ovary of one carpel.

XXV. Rose family. Flowers regular. Stamens indefinite. Ovary (at least when young) apocarpous.

XXVI. *Oenothera* family. Perianth in twos or fours. Stamens definite. Ovary inferior. One style.

XXVII. *Lythrum* family. Stamens usually definite, inserted with the petals at the top of the calyx-tube. Ovary syncarpous within the base of the tube. One style. Lower leaves opposite.

XXVIII. Gourd family. Climbers with tendrils. Flowers unisexual. Ovary inferior.

XXIX. *Crassula* family. Leaves succulent. Sepals, petals, stamens of one or two rows, and free carpels, all isomerous.

XXX. *Ribes* genus or family. Shrubs. Flowers regular. Stamens definite. Ovary inferior. Placentas parietal. One style.

XXXI. Saxifrage family. Flowers regular. Stamens definite. Ovary syncarpous at the base, but a separate style for each carpel.

*** Petals and stamens epigynous (round an epigynous disk).*

XXXII. Umbellate family. Leaves alternate. Fruit dry, separating from the axis into seed-like carpels.

XXXIII. *Aralia* family. Leaves alternate. Fruit succulent. Carpels often more than two, and not separating.

XXXIV. Mistletoe family. Parasites. Stamens on, or opposite to the petals. Leaves usually opposite. Ovary one-celled.

XXXV. Cornel family. Leaves usually opposite. Stamens alternate with the petals. Style one.

Subclass 3. MONOPETALS.—Petals united (at least at the base) into a single corolla.

§ 1. *Corolla epigynous, bearing the stamens.*

XXXVI. Honeysuckle family. Leaves opposite. No stipules. Ovary 2- or more celled.

XXXVII. Stellate tribe (of the Madder family). Stipules like the leaves in appearance, and forming whorls with them round the stem. Ovary 2-celled, with one seed in each cell.

XXXVIII. Valerian family. Stamens fewer than the lobes of the corolla. Ovary and fruit one-seeded.

XXXIX. Teasel family. Florets in compact heads or spikes. Stamens isomerous. Anthers free. Ovary and fruit 1-seeded.

XL. Composite family. Florets in compact heads. Stamens isomerous. Anthers united in a ring round the style. Ovary and fruit one-seeded.

§ 2. *Stamens free from the corolla.*

XLI. (Vol. II.) Campanula family. Herbs. Stamens as many as the corolla-lobes. Anthers opening longitudinally.

XLII. Heath family. Shrubs. Stamens usually twice as many as the corolla-lobes. Anthers opening in pores or cross valves.

§ 3. *Corolla hypogynous, bearing the stamens.*

** Placenta free central.*

XLIII. Primrose family. Stamens isomerous and opposite the corolla-lobes.

XLIV. Pinguicula family. Corolla very irregular. Stamens fewer than the lobes and alternate with them.

**** Placentas parietal, or in the axial angle of the cells.**

a. Corolla regular, or nearly so.

XLV. Holly family. Trees or shrubs, flowers small. Ovary 4- or more celled, with one ovule in each cell.

XLVI. Jessamine family. Trees or shrubs. Stamens 2, alternating with the 2 ovary-cells, and having no constant relation to the corolla-lobes.

XLVII. Periwinkle family. Corolla contorted. Stamens isomerous. Ovary of 2 carpels, usually distinct, whilst the styles are united at the top.

XLVIII. Gentian family. Bitter plants. Corolla contorted. Stamens isomerous. Placentas parietal, rarely meeting in the axis.

XLIX. Polemonium family. Corolla contorted. Stamens isomerous. Ovary 3-celled, with several seeds.

L. Convolvulus family. Corolla plaited. Stamens isomerous. Ovary 2- or 3-celled, with 2 (rarely 1) ovules in each, often separated by an additional false partition.

LI. Borage family. Stamens isomerous. Ovary 2- or 4-lobed, with one ovule in each lobe.

LII. Solanum family. Stamens isomerous. Corolla plaited or imbricate. Ovary 2-celled, with several ovules in each cell.

β. Corolla irregular. Stamens one less or three less than the lobes.

LIII. Broomrape family. Leafless parasites. Placentas parietal, or rarely meeting in the axis.

LIV. Scrophularia family. Ovary 2-celled, with several ovules in each cell.

LV. Labiate family. Ovary 4-lobed, with one ovule in each lobe.

LVI. Vervein family. Ovary entire, 2- or 4-celled, with one ovule in each cell.

***** Anomalous families.**

LVII. Plumbago family. Ovary with one cell and ovule, but several styles.

LVIII. Plantain family. Corolla scarious. Stamens isomerous.

Subclass 4. MONOCHLAMYDS.—Perianth really or apparently simple, or none.

LIX. Paronychia family. Perianth small, often scarious. Ovary with one cell and ovule, but 2 or more styles or style-branches. Leaves usually opposite with scarious stipules.

LX. Goosefoot family. Perianth small; stamens opposite to its lobes. Ovary with one cell and ovule, but 2 or more styles, or stigmas. No stipules.

LXI. Polygonum family. Perianth small. Ovary with one cell and ovule, but 2 or more styles or stigmas. Stipules sheathing.

LXII. Daphne family. Stamens inserted in the tube of the perianth, and usually double the number of its lobes. Ovary free, with one pendulous ovule. One style.

LXIII. Elæagnus family. Shrubs or trees, with scurfy leaves. Flowers mostly unisexual. Ovary free in the bottom of the perianth-tube, with one erect ovule.

LXIV. Sandalwood family. Perianth-lobes valvate. Ovary inferior, 1-celled with 2 or 3 pendulous ovules. Styles simple.

LXV. Aristolochia family. Perianth irregular, or 3-lobed. Stamens 6 or 12. Ovary inferior, 3- or 6-celled, with numerous ovules.

LXVI. Spurge family. Flowers unisexual. Fruit separating into 3 (rarely 2 or more) carpels, leaving a persistent axis, each carpel containing one or two pendulous seeds.

LXVII. Empetrum genus or family. Differs from the Spurge family in the ovules and seed erect.

LXVIII. Ceratophyll and Callitriche. Anomalous aquatic genera. Perianth none. Ovary with 1 or 4 cells, and one seed in each.

LXIX. Nettle family. Flowers unisexual, small and green. Stamens opposite the perianth-divisions (usually 4). Ovary free, with a single ovule, and 2 (rarely 1) styles or stigmas.

LXX. Elm tribe or family. Trees. Flowers often bisexual, the stamens opposite the lobes. Ovary free, 2-celled, with one erect ovule in each cell.

LXXI. Catkin family. Trees or shrubs. Flowers unisexual, the males in catkins with an imperfect perianth, or none at all. Fruit of the females one-celled.

LXXII. Pine family or class. Trees or shrubs with stiff or scale-like leaves. Flowers unisexual, the males in catkins without perianth. Ovules and seeds the females not enclosed in any ovary or pericarp.

CLASS II.—MONOCOTYLEDONS.

In germination the plumule is developed from a sheath-like cavity on one side of the embryo.

* *Perianth none, or of 4 small sepals or bracts.*

LXXIII. Bulrush family. Flowers unisexual, intermixed with bracts in dense heads or spikes. Fruit a dry nut.

LXXIV. Arum family. Flowers unisexual, often intermixed with bracts, in dense heads or spikes, mostly in a spathe. Fruit usually succulent.

LXXV. Duckweed genus. No distinct stem. Flowers (very scarce) on the edge of the small leaf-like floating fronds.

LXXVI. Naias family. Floating or submerged plants. Flowers distinct, or in loose spikes. Stamens 1, 2, or 4. Ovaries 1, 2, or 4.

** *Perianth wholly or partially petal-like. Ovary apocarpous.*

LXXVII. Alisma family, the only known British one.

*** *Perianth wholly or partially petal-like. Ovary inferior.*

LXXVIII. Hydrocharis family. Floating or submerged plants. Flowers usually unisexual. Perianth regular, with a slender tube.

LXXIX. Orchid family. Perianth very irregular. Anther 2-celled, combined with the style in an axile column.

LXXX. Iris family. Like the Amaryllis family, but stamens 3. Leaves often in two opposite rows.

LXXXI. Amaryllis family. Terrestrial plants. Perianth of 6 divisions. Stamens 6.

LXXXII. Yam family. Twining plants. Flowers unisexual. Perianth regular, of 6 divisions.

*** *Perianth regular. Ovary syncarpous, superior.*

LXXXIII. Lily family. Perianth petal-like.

LXXXIV. Rush family. Perianth stiff, or calyx-like. Capsule 3-celled, with several seeds, or one erect seed in each cell.

LXXXV. Restio family. Perianth calyx-like. Flowers unisexual. Ovary with one pendulous ovule in each cell.

**** *Perianth rudimentary or none, replaced by chaffy scales or bracts enclosing the flowers.*

LXXXVI. Sedge family. Leaf-sheaths entire. Each flower in the axil of one bract.

LXXXVII. Grass family. Leaf-sheaths split open opposite the blade. Each flower enclosed in two bracts.

CLASS III.—CRYPTOGAMS.

No true flowers ; that is, no stamens or pistils.

LXXXVIII. Clubmoss family. Spores in closed capsules on the stem, or in the axils, or in the base of the leaves.

LXXXIX. Equisetum family. Stems jointed, with whorled branches. Spores under peltate scales, in terminal heads or spikes.

XC. Fern family. Spores in minute cases or capsules clustered on the back or margins of the fronds.

The remaining families of British Cryptogams are not included in the present Flora.

CLASS I. DICOTYLEDONS.

Stem, when perennial, consisting of a pith in the centre, of one or more concentric circles containing fibrous tissue, and of the bark on the outside. Seeds with two cotyledons, the young stem in germination proceeding from between the two lobes of the embryo, or from a notch in its summit.

The above characters are all that can be said to be constant to separate *Dicotyledons* from *Monocotyledons*. They are however in most cases very difficult to observe, and yet the distinction is essential, for these two great classes have each their peculiar aspect, which, after a very little habit, the botanist will in most cases recognize at a glance. All British trees and shrubs are *Dicotyledons*, so also are all plants with opposite, or whorled, or netted-veined leaves (except *Paris* and a few aquatic plants), and almost all those which have the parts of the flower in fours, fives, or eights.

I. THE RANUNCULUS FAMILY. RANUNCULACEÆ.

Herbs with alternate or radical leaves, or, in one genus, climbers with opposite leaves, the leaf-stalk in both cases generally dilated at the base without stipules, the leaf often cut, and the flowers solitary or in terminal racemes or panicles. Sepals distinct, more than 2 (usually 5). Petals distinct, usually 5, but sometimes either deformed or very minute, or altogether wanting. Stamens indefinite, usually numerous, inserted on the receptacle. Carpels several, distinct or partially united (very rarely reduced to a single one), each bearing a distinct style and enclosing a single cell, with one or more ovules or seeds attached to the base or to the inner angle of the cavity. Seed containing a copious albumen, with a minute embryo.

Although, from the variable nature of the flowers, especially of the petals, the above character may be somewhat vague, yet the great ma-

jority of *Ranunculaceæ* are easily distinguished by their numerous, free, hypogynous stamens, and by their distinct carpels. Where, as in *Mousetail*, the stamens are few, the carpels are numerous; and, on the other hand, if in *Actæa* and some *Larkspurs* the carpels are solitary, they are unilateral, with the ovules attached to one side or angle of their single cell, showing that they are simple, not composed of the union of several, as is the case with the central ovaries of the *Poppy* and *Cistus* families, which have either several cells or several rows of ovules. Another very distant Order, which may at first sight be confounded with the present one, is that of the *Alismas*, among Monocotyledons: but besides the microscopical character derived from the embryo, there are but three petals and sepals, as in most other Monocotyledons, a rare circumstance in the *Ranunculus* family.

Ranunculaceæ are widely diffused over the globe, but more especially in temperate or cool climates. Within the tropics they are, with the exception of *Clematis*, almost confined to high mountain-ranges. Most of the principal genera are represented in our Flora.

Climber with opposite leaves. Carpels one-seeded. Sepals coloured

1. CLEMATIS.

Herbs with alternate or radical leaves, rarely opposite on runners.

Carpels several or numerous, short, one-seeded. Flowers always regular.

Sepals 4, 5, or more, often coloured and petal-like, but no real petals.

An involuere of three leaves outside the flower or on the stalk

3. ANEMONE.

No involuere. Floral leaves alternate. Stamens longer than the sepals

2. THALICTRUM.

Petals 5 or more, usually more conspicuous than the sepals.

Carpels very numerous, in a long, cylindrical column.

Petals very small, with a tubular claw

5. MOUSETAIL.

Carpels in a globose or oblong head. Petals flat.

Petals (usually yellow or white) with a little seale, or a thickened hollow spot at the base of each

6. RANUNCULUS.

Petals (usually red) without any seale or thickened spot at the base

4. ADONIS.

Carpels several, each with several seeds.

Flowers very irregular or spurred.

Upper sepal helmet-shaped, without a spur

12. ACONITE.

Upper sepal with a long spur at the base

11. LARKSPUR.

Sepals flat and regular. Petals with a spur at the base of each

10. COLUMBINE.

Flowers regular.

- Sepals large, often coloured. Petals small or none.
 Sepals bright yellow and petal-like. Real petals
 none 7. *CALTHA*.
 Sepals pale yellow and petal-like. Petals small,
 flat, and linear 8. *TROLLIUS*.
 Sepals greenish. Petals small and tubular . . . 9. *HELLEBORE*.
 Sepals green, smaller than the large red or white
 petals 14. *PÆONY*.
Carpels solitary, with several seeds.
 Fruit a capsule. Flowers spurred 11. *LARKSPUR*.
 Fruit a berry. Flowers nearly regular, small . . . 13. *ACTEA*.

Among old inhabitants of our gardens, which may sometimes be found to spread spontaneously, are the exotic genera *Eranthis* (Winter Aconite of our gardeners) and *Isopyrum*, both closely allied to *Hellebore* and *Nigella* (Devil-in-the-bush), which differs from *Hellebore* in the more petal-like sepals, and the carpels closely connected together to the middle, but diverging at the top into five long points.

I. *CLEMATIS*. CLEMATIS.

Stem usually climbing, and often woody at the base. Leaves opposite. Sepals 4 or 5, valvate in the bud, coloured and petal-like. No real petals. Stamens numerous. Carpels numerous, 1-seeded.

A numerous genus, well characterized, widely spread over the globe, and almost the only representative of the Order in tropical climates. Several European, Asiatic, and North American species are among the hardy climbers cultivated in our gardens.

1. Common Clematis. *Clematis Vitalba*, Linn. (Fig. 1.)

(Eng. Bot. t. 612. *Traveller's Joy*, *Old Man's Beard*.)

A large climber, the only indigenous plant which may give a faint idea of the bush-ropes of the tropics. Its woody stems will attain even the thickness of the wrist and a length of several yards, whilst the young branches spread to a great extent over shrubs and trees, clinging by their twisted petioles. Leaves pinnate, usually with five ovate stalked segments. Flowers greenish-white, in loose panicles at the ends of short, axillary or terminal branches. Carpels, when ripe, very conspicuous from the persistent styles, which grow out into long, feathery awns.



Fig. 1.

In hedges, thickets, and open woods in central and southern Europe to the Caucasus. Abundant in several of the southern and some of the central counties of England, and naturalized in Ireland. *Fl. summer.*

II. **THALICTRUM.** THALICTRUM.

Herbs with a short, perennial rootstock, annual, erect stems, and much divided leaf-stalks, bearing distinct segments or leaflets. Sepals 4 or 5, small, coloured and petal-like, but no real petals. Stamens numerous, with long anthers projecting beyond the calyx. Carpels several, 1-seeded, furrowed, and usually acute at both ends.

A considerable genus generally diffused over the northern hemisphere, distinguished from *Actæa* by the distinct one-seeded carpels, from all others of the Order by the thin texture of the sepals, almost concealed by the prominent stamens, and the peculiar foliage. The species are very variable and difficult to characterize. They have also been much multiplied by modern botanists, but if many of their forms be considered as mere varieties, and the British species limited to three, their characters are more striking.

Stem simple, seldom 6 inches high 1. *Alpine T.*
Stem one or more feet high.

Leaflets roundish; panicle diffuse; flowers mostly drooping 2. *Lesser T.*

Leaflets obovate or wedge-shaped; panicle compact; flowers
mostly erect 3. *Yellow T.*

Some foreign European species are to be met with in old gardens, especially the tall, handsome *T. aquilegifolium*.

1. **Alpine Thalictium.** *Thalictium alpinum*, Linn. (Fig. 2.) (Eng. Bot. t. 262.)



Fig. 2.

Stem usually simple and almost leafless, from 4 to 6 inches high. Leaves mostly radical, about half the height of the stem, with the footstalk twice divided into three or five branches; leaflets small, roundish and crenate or lobed. Panicle nearly reduced to a simple raceme. Flowers few and drooping, each with 4 small sepals. Stamens from 10 to 20. Carpels generally reduced to 2 or 3. Pedicel of the fruit recurved, as well as that of the flower.

An alpine plant, frequent in the mountains of northern Europe and

Asia, and at considerable elevations in the great mountain-chains of central and southern Europe and central Asia. Abundant in the Highlands of Scotland; more local in Ireland, in northern England, and North Wales. *Fl. summer.*

2. Lesser *Thalictrum*. *Thalictrum minus*, Linn. (Fig. 3.)

(Eng. Bot. t. 11. *T. majus*, Eng. Bot. t. 611, and *T. flexuosum*,
Bab. Man.)

A very variable species; in dry limestone soils often not more than a foot high, of a glaucous hue, or slightly downy; in moist, rich situations (where however it is seldom found) it is much larger and greener, but readily distinguished from the following species by its loose panicle occupying a great part of its height; the pedicels also are as long as or longer than the flower, and recurved at least before the flower is expanded, although they become erect as the fruit ripens. Stem usually in zigzag, making a bend at every node. Petioles, especially of the lower and root-leaves, three or four times divided, with very numerous, small leaflets, roundish or broadly wedge-shaped, trifid and toothed. Flowers usually of a pale greenish-yellow, with a pink tinge on the sepals. Stamens numerous, with long, narrow anthers. Carpels from 3 to 5 or 6, very acute and strongly furrowed.



Fig. 3.

In dry situations, chiefly in limestone countries, throughout Europe and Russian Asia, except the extreme north. Scattered over Britain, chiefly in Scotland and north-western England, but not common. *Fl. summer.* Several varieties, distinguished by size, colour, pubescence, luxuriance of foliage, etc., or by the lower leaves being fully developed or reduced to mere sheaths, have been described as species by Continental botanists; and three or four of these forms have been mentioned as British, but their characters are exceedingly vague and uncertain.

3. Yellow *Thalictrum*. *Thalictrum flavum*, Linn. (Fig. 4.)

(Eng. Bot. t. 367. *Meadow Rue*.)

The largest of the British species, being generally from 2 to 3 feet in height and of a deeper green than the last. Stem stout and furrowed. Leaves large, the stalks two or three times divided, the



Fig. 4.

leaflets much fewer than in the *lesser T.*, but larger, being often an inch in length, obovate or wedge-shaped at the base. Panicle compact and rather corymbose. Pedicels short and erect even before the flower expands. Flowers, especially the stamens, decidedly yellow.

In moist meadows, and along ditches, in Europe and Russian Asia, scarcely extending so far north as the *lesser T.* Found in England, Ireland, and southern Scotland, but not very common. *Fl. summer.* Here again some botanists distinguish several species, according as the rootstock is more or less creeping, or

whether sessile leaflets resembling stipules are or are not formed at the base of the branches of the petiole.

III. ANEMONE. ANEMONE.

Rootstock perennial. Leaves radical. Flower-stem naked, excepting an involucre of three leaves usually at a considerable distance from the flowers. Sepals 5 or more, frequently 6, coloured and petal-like, longer than the stamens. No petals. Stamens numerous. Carpels numerous, one-seeded, pointed or ending in a long feathery awn.

A large genus, found in almost all temperate regions of the globe, chiefly characterized by the three leaves placed in a whorl, from half-way up the flowering stem to very near the flowers, according to the species. When much divided, these leaves may appear at first sight to be more numerous, but they always form a single whorl, and when closely examined they will always be found united at the base into three.

Flowers purple, silky outside. Carpels ending in feathery awns

1. *Pasque A.*

Flowers white or pink, glabrous. Carpels ending in a point

2. *Wood A.*

Several species from continental or southern Europe are cultivated in our gardens, especially the *A. pratensis*, the *Hepatica* (*A. Hepatica*), which has the involucre so close to the flower as to assume the appearance of a calyx. Two other South European species, the *Apennine A.*

(*A. apennina*, Eng. Bot. t. 1062) and the *yellow A.* (*A. ranunculoides*, Eng. Bot. t. 1484), both with the habit and carpels of the *wood A.*, but the one with bright blue, the other with yellow flowers, appear to have occasionally strayed into our woods and plantations, and have therefore been included in most British Floras.

1. Pasque Anemone. *Anemone Pulsatilla*, Linn. (Fig. 5.)

(Eng. Bot. t. 51. *Pasque-flower*.)

Rootstock thick and woody. Radical leaves on long stalks, covered when young with silky hairs, and two or three times divided into long linear segments. Flower-stalk 5 to 8 inches high, with the involucre at first near the flower, but becoming gradually more remote as the fruit ripens, and consisting of three sessile leaves, deeply cut into linear segments. Flowers solitary, large, with 6 sepals of a dull violet-purple, very silky outside. Awns of the carpels long and feathery, like those of a *Clematis*.



Fig. 5.

In open limestone pastures, in the greater part of Europe and Russian Asia, but not very far northwards. Distributed over several parts of England, but wanting in Scotland. *Fl. spring*.

2. Wood Anemone. *Anemone nemorosa*, Linn. (Fig. 6.)

(Eng. Bot. t. 355.)

Rootstock black and horizontal, emitting from its extremity two or three leaves and a single flower-stalk, all glabrous or but slightly downy. Leaf-stalks long, with three ovate or lanceolate leaflets, toothed or lobed, or often divided almost to the base into three similarly shaped segments. Peduncle 3 to 6 or 8 inches high, the involucrel leaves at about two-thirds of its height, like the radical ones, but smaller, with shorter stalks. Sepals 6, white or reddish outside, and perfectly glabrous. Carpels downy, with a point nearly as long as themselves, but not feathery.

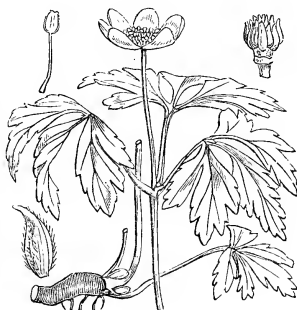


Fig. 6.

Common in and near woods, throughout Europe and Russian Asia,

except in the extreme north. Abundant in Great Britain. *Fl. early spring.*

IV. ADONIS. ADONIS.

Characters those of *Ranunculus*, except that the petals have no nectary, although they are often more deeply coloured at the base, and that the seed is suspended, not erect, in the carpel.

The species are few, chiefly from southern Europe and western Asia, and have mostly red or straw-coloured flowers.

1. Common Adonis. *Adonis autumnalis*, Linn. (Fig. 7.)

(Eng. Bot. t. 308. *Pheasant's Eye*.)

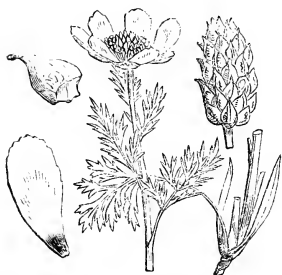


Fig. 7.

An erect annual, from 8 inches to a foot or rather more, glabrous or slightly downy. Leaves finely divided into numerous narrow linear segments. Sepals green or slightly coloured. Petals 5 to 8, rather longer than the calyx, of a bright scarlet, with a dark spot at the base. Carpels numerous, and rather large, arranged in a head at first ovate or oblong, but which often lengthens considerably and becomes cylindrical as the fruit ripens.

In cornfields, in central and southern Europe and western Asia. Not very common in Britain, but appears occasionally, especially in the warmer counties of England and Ireland, and sometimes in Scotland. *Fl. summer and early autumn.* A variety with larger flowers was formerly much cultivated in flower-gardens under the name of *Flos Adonis*.

V. MOUSETAIL. MYOSURUS.

Annuals with entire leaves. Sepals 5. Petals 5, small, linear, with tubular claws. Stamens few. Carpels small, one-seeded, very numerous, arranged in a long and dense cylindrical spike. Ovule attached near the top of the cell.

A genus containing besides the European species but one other one from western America, and chiefly distinguished from the small-flowered *Ranunculuses* by the tubular claw of the petals, and from most of that genus by the attachment of the ovule.

1. Common Mousetail. *Myosurus minimus*, Linn. (Fig. 8.)(Eng. Bot. t. 435. *Mousetail*.)

A small annual with linear radical leaves, sometimes not an inch long, sometimes attaining 2 or even 3 inches, including their long footstalk. Peduncles also radical, rather longer than the leaves, often enlarged and hollow at the top, with a single small yellowish flower. Sepals prolonged below their insertion into a kind of spur. Petals rarely longer than the calyx, and very narrow. Carpels very numerous, forming a head which lengthens into a close slender spike, 1 or even 2 inches in length.

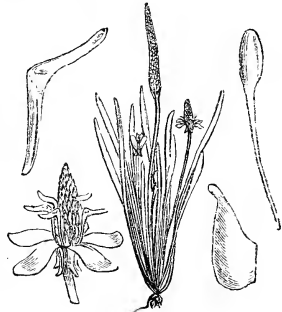


Fig. 8.

In moist sandy or gravelly fields and waste places, in Europe, Russian Asia, northern and western America, and Australia. Not uncommon in the south and south-east of England, rare in Scotland, and not yet detected in Ireland. *Fl. spring*.

VI. **RANUNCULUS.** RANUNCULUS.

Annual or perennial herbs, sometimes entirely aquatic. Leaves entire or more or less divided. Flowers usually yellow or white. Sepals 5, very rarely reduced to 3. Petals 5, or sometimes more, each with a thickened hollow spot at the base, often covered by a minute scale. Stamens usually numerous. Carpels numerous, without awns, in a globular or oblong head, each containing a single ovule attached near its base.

A numerous genus, widely spread over the temperate regions of the globe and even found under the tropics. It is easily distinguished from *Anemone* by the want of the involucre. The so-called *nectary* at the base of the petals, which separates it from *Adonis*, is sometimes reduced to a slightly discoloured, concave spot. In the small-flowered species one or more of the petals are often wanting, and the stamens reduced to very few.

Flowers white. Carpels transversely wrinkled. Plant floating in water or creeping in mud.

- | | |
|---|--------------------|
| Lower leaves or all the leaves finely cut. Receptacle usually hairy | 1. <i>Water R.</i> |
| All the leaves rounded with broad lobes. Receptacle glabrous | 2. <i>Ivy R.</i> |

Flowers yellow. Carpels smooth or tuberculate. Plant terrestrial or not floating.

Leaves all undivided.

Petals 5, or fewer.

Carpels with a stout beak. Stem erect, 2 feet or more. Flowers large

3. *Great R.*

Carpels with a short point. Stems seldom above a foot, often decumbent. Flowers little more than half an inch in diameter or smaller.

Petals much longer than the calyx. Leaves mostly narrow

4. *Spear R.*

Petals very small. Leaves mostly ovate or broad lanceolate

5. *Snake-tongue R.*

Petals more than 5, usually 8 or 9

6. *Figwort R.*

Leaves divided or deeply cut.

Carpels smooth or slightly tuberculate near the edge. Rootstock (in all but 7 and 12) perennial.

Leaves glabrous or very slightly downy.

Petals conspicuous, bright yellow. Carpels downy, in a globular head

8. *Wood R.*

Petals very small. Carpels small, numerous, in an ovate or oblong head

7. *Celery-leaved R.*

Leaves hairy.

Calyx spreading but not reflexed.

Stems erect without runners. Lower leaves palmately divided

9. *Meadow R.*

Runners creeping and rooting. Central division of the lower leaves projecting beyond the others

10. *Creeping R.*

Calyx closely reflexed on the peduncle.

Rootstock or thickened base of the stem perennial. Carpels perfectly smooth

11. *Bulbous R.*

Annual. Carpels marked with a few tubercles within the margin

12. *Hairy R.*

Carpels covered with tubercles or prickles. Annuals.

Leaves glabrous, segments narrow. Carpels very prickly. Plant erect

14. *Corn R.*

Leaves hairy, segments broad. Carpels tuberculate. Stems weak

13. *Small-flowered R.*

The showy *double Ranunculus* of our gardens belongs to a Levant species (*R. asiaticus*). Double-flowered varieties of several others, especially of our common yellow *Buttercups*, and of the white-flowered Continental *R. aconitifolius*, are known to our gardeners under the name of *Bachelor's buttons*.

1. **Water Ranunculus.** *Ranunculus aquatilis*, Linn. (Fig. 9.)

A most variable species, but easily known by its stem either floating in water or creeping along mud, by its white flowers, and very small ovoid carpels marked with transverse wrinkles. It is glabrous in all its parts, excepting sometimes the carpels and their receptacle. The lower leaves and sometimes all, remaining under water, are divided into numerous very fine linear segments, whilst those which spread on the surface are rounded and more or less cut into 3 or 5 wedge-shaped, obovate, or rounded lobes. Flower-stalks axillary and 1-flowered. Petals 5 or sometimes more, without any scale over the spot at their base.

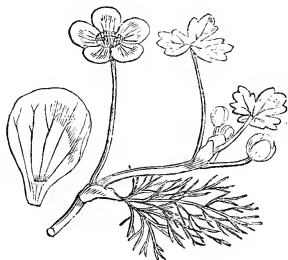


Fig. 9.

In ponds, streams, and wet ditches throughout Europe and Russian Asia, North America, and Australia. Abundant in Britain. *Fl. the whole season.* Many of the forms it assumes are striking, and have been distinguished as species, but the characters, although often to a certain degree permanent, appear at other times so inconstant, and even to depend so much on the situation the plant grows in, that we can only consider them as mere varieties. The following are the most prominent.

a. *Floating water R.* (Eng. Bot. Suppl. t. 2870.) All the leaves submerged and finely cut, the segments long and parallel. Flowers large, on long stalks.—Chiefly in running streams.

b. *Capillary water R.* (Eng. Bot. Suppl. t. 2869.) All the leaves submerged and finely cut, but with shorter segments spreading in every direction. Flowers large.—Chiefly in deep still waters.

c. *Common water R.* (Eng. Bot. t. 101.) Lower leaves submerged and finely cut; upper leaves floating, rounded and broadly lobed. Flowers very variable in size.—The commonest state of the plant, passing into all the other varieties.

2. **Ivy Ranunculus.** *Ranunculus hederaceus*, Linn. (Fig. 10.)
(Eng. Bot. t. 2003.)

Very closely allied to the *water R.*, and probably, as given in the first edition of the 'Handbook,' a variety of that species, but as in our own country, at least, it is very constant, and the question of its origin admits of considerable doubt, I here admit it in deference to the opinion of others. It never appears to produce the finely cut leaves of the *water R.*, but, creeping on mud or floating in shallow water, it roots



Fig. 10.

at every joint, bearing rounded and broadly-lobed leaves, like the upper ones of the *water R.* The flowers are usually very small, the petals scarcely exceeding the sepals, and the carpels and receptacles are quite glabrous.

Chiefly in wet ditches in western and northern Europe, common in Britain. *R. cænosus* is a variety with much larger flowers, rare in Britain, but more common as we proceed to southern Europe, where forms occur closely connecting the *ivy R.* with the *water R.* Several of these are designated under the name of *R. tripartitus*.

3. Great Ranunculus. *Ranunculus Lingua*, Linn. (Fig. 11.) (Eng. Bot. t. 100. *Great Spearwort*.)



Fig. 11.

Rootstock emitting a dense mass of fibrous roots, and perennial by means of creeping runners. Stems erect, stout, and hollow, 2 or 3 feet high, the lower nodes emitting whorls of fibrous roots. Leaves long, lanceolate, entire or with only a few small teeth at the edge, glabrous, with a few nearly parallel veins. Flowers above an inch in diameter, in a kind of loose panicle; the petals of a bright shining yellow. Carpels ending in a short broad flat beak.

In marshes, wet ditches, and on the edges of lakes, over the greater part of Europe and Asia, but not an Arctic plant. Pretty frequent, though by no means general in England, Ireland, and Scotland, as far north as Moray. *Fl. summer*.

4. Spear Ranunculus. *Ranunculus Flammula*, Linn. (Fig. 12.) (Eng. Bot. t. 387. *Spearwort*.)

A glabrous perennial of short duration, or frequently only annual, much smaller and more slender than the *great R.* Stems usually more or less decumbent at the base, and rooting at the lower joints, seldom above a foot high, with a few loose branches. Lowest leaves often ovate, the remainder lanceolate or linear, and all entire or slightly

toothed. Flowers yellow, on long peduncles, seldom more than half an inch in diameter, and often much smaller. Carpels in a small globular head, each with a very short, usually hooked beak.

In marshes and wet pastures, and on the borders of lakes and ponds, common throughout Europe, except perhaps the southern extremity, extending all over Russian Asia, and, at high latitudes, into North America. Abundant in Britain. *Fl. the whole summer.* It varies much in the size of its parts, the breadth of the leaves, etc.; and a not uncommon form, with slender creeping stem and small flowers, has been published as a species under the name of *R. reptans*.



Fig. 12.

5. Snaketongue Ranunculus. *Ranunculus ophioglossifolius*, Vill. (Fig. 13.)

(Eng. Bot. Suppl. t. 2833.)

Very nearly allied to the *spear R.*, but said to be always annual. The stem is more erect and branched, the lower leaves broadly ovate, and sometimes slightly cordate, and all broader in proportion than in the *spear R.*, and the flowers smaller, the petals scarcely exceeding the calyx. Carpels minutely granulated.

In marshes in southern Europe, extending northward through western France to St. Peter's marsh in Jersey, where it was found by Mr. Babington. *Fl. June.*



Fig. 13.

6. Figwort Ranunculus. *Ranunculus Ficaria*, Linn. (Fig. 14.)

(Eng. Bot. t. 584. *Lesser Celandine*.)

Rootstock small, emitting a number of oblong or cylindrical tubers, which are renewed annually. Leaves mostly radical, cordate, obtuse, angular or crenate, thick, smooth, and shining. Flower-stems usually scarcely longer than the root-leaves, bearing one or two small leaves



Fig. 14.

and a single flower, with 3 sepals and 8 or 9 oblong petals, of a bright glossy yellow. Carpels rather large, in a glo-bular head.

In fields, pastures, and waste places, a very common weed throughout Europe and western Asia. Abundant in Britain, except perhaps the west Highlands of Scotland. *Fl. spring, one of the earliest that appears.* It varies occasionally with a slightly branched creeping stem of 8 or 9 inches or even more.

7. Celery-leaved *Ranunculus*. *Ranunculus sceleratus*, Linn.

(Fig. 15.)

(Eng. Bot. t. 681.)



Fig. 15.

An erect, much branched annual, usually under a foot, but sometimes near two feet high, glabrous or nearly so. Stem thick and hollow. Lower leaves stalked, divided into three or more obtusely toothed or lobed segments, the upper ones sessile, with three narrow segments. Flowers small and numerous, the petals pale yellow, scarcely longer than the calyx, and without any scale over the hollow spot at their base. Car-pels very small and numerous, in a dense head, which becomes oblong as the fruit ripens.

On the sides of pools and wet ditches, over nearly the whole of Eu-rope and Russian and central Asia, and now spread into North America. Scattered pretty frequently through the chief part of Britain. *Fl. summer.*

8. Wood *Ranunculus*. *Ranunculus auricomus*, Linn.

(Fig. 16.)

(Eng. Bot. t. 624. *Goldilocks*.)

A perennial, with the large bright yellow flowers of the *meadow R.*, but not so tall, more glabrous, having only a few appressed hairs, es-pecially in the upper parts, and the lower leaves less cut and more ob-tuse. Stem seldom above a foot high, erect and branched. Radical

leaves on long stalks, rounded or reniform and but little cut. Stem-leaves few, sessile, divided to the base into narrow segments, which are entire or slightly toothed. Carpels of the size of those of the *meadow R.*, but downy.

In woods and bushy places in northern and central Europe and Russian and western Asia. Frequent in England and Ireland, less so in Scotland, and scarce in the Highlands. *Fl. spring.*



Fig. 16.

9. Meadow Ranunculus. *Ranunculus acris*, Linn. (Fig. 17.)

(Eng. Bot. t. 652. *Crowfoot. Buttercups.**)

A perennial, very variable in size, but generally one of the tallest of our species, more or less covered with soft hairs, which are mostly spreading, but deflexed on the lower parts of the stem, and appressed on the peduncles. Stems erect, often 2 or 3 feet high, but in poor or mountain stations sometimes not 6 inches. Leaves nearly all stalked and deeply divided into 3, 5, or 7 palmate segments, which are again cut into 3 toothed lobes, the divisions lanceolate and acute, those of the lower leaves broader and sometimes wedge-shaped, the upper ones narrower and fewer. Flowers rather large, bright yellow, on long terminal peduncles, forming usually large loose panicles. Sepals yellowish-green, concave, shorter than the petals, spreading horizontally, but not reflexed on the peduncle. Carpels ovate, compressed, glabrous, in a globular head.



Fig. 17.

In meadows and pastures, cultivated and waste places, very common throughout Europe and Russian Asia, and naturalized in North America. Very abundant in Britain. *Fl. early summer, and sometimes till late in autumn.* In mountain pastures it is often small, with only one or very few flowers.

10. Creeping Ranunculus. *Ranunculus repens*, Linn. (Fig. 18.)

(Eng. Bot. t. 516.)

With the flowers and fruit of the *meadow R.*, this species is easily distinguished by the runners shooting from among the radical leaves,

* These names are popularly applied to nearly all the species of *Ranunculus* with bright yellow flowers and divided leaves.

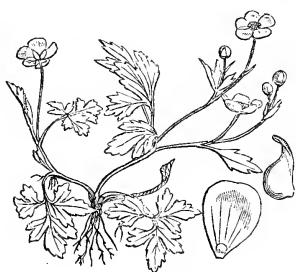


Fig. 18.

In pastures, cultivated and waste places throughout Europe, Russian Asia, and a portion of North America. In Britain almost as abundant as the *meadow R.*, and a very troublesome weed in rich soils. *Fl. all summer, and often till late in autumn.*

11. Bulbous Ranunculus. *Ranunculus bulbosus*, Linn.

(Fig. 19.)

(Eng. Bot. t. 515.)



Fig. 19.

A perennial, much smaller and usually more hairy than the *meadow R.*, of which it has the bright yellow petals. Stem seldom above a foot high, and usually thickened at the base into a kind of bulb. Leaves more like those of the *creeping R.*, but smaller, divided into three segments more or less cut, but broader than in the *meadow R.* It is moreover distinguished from all but the *hairy R.* by the sepals, which, as soon as the flower expands, are closely reflexed on the peduncle. Carpels glabrous and smooth.

In meadows, pastures, and waste places over the greater part of Europe, but disappearing in the north-east, scarcely penetrating into western Asia, but naturalized in North America. Abundant in England, Ireland, and southern Scotland, rare, if really wild, in the north. *Fl. early summer.*

11. Hairy Ranunculus. *Ranunculus philonotis*, Ehrh. (Fig. 20.)

(*R. hirsutus*, Eng. Bot. t. 1504.)

An erect annual, much branched from the base, six inches to near a foot high, with the foliage and reflexed calyx of the *bulbous R.*, but the

flowers more numerous, rather smaller, and of a paler yellow, and the hairs of the stem usually fewer and looser, although in this respect both species are variable. Carpels marked with a series of minute tubercles (visible especially when dry) within the rather broad margin.

In fields, cultivated and waste places, in central and southern Europe, extending eastward to the Caucasus, and northward to southern Sweden. In most parts of England and southern Scotland, but not generally common, and rare in Ireland. *Fl. summer.*



Fig. 20.

13. Small-flowered Ranunculus. *Ranunculus parviflorus*, Linn. (Fig. 21.)

(Eng. Bot. t. 120.)

A hairy annual, with weak, prostrate or ascending stems, from a few inches to about a foot in length. Leaves nearly orbicular, the lower ones 5-lobed or crenate, the upper ones divided into 3 or 5 segments, which are more or less lobed, but generally less so than in the *hairy R.* Peduncles short, mostly opposite to the leaves. Flowers small and yellow, the petals narrow, seldom exceeding the calyx. Carpels covered with small tubercles.



Fig. 21.

In cultivated and waste places in western and southern Europe, and apparently the same species in Australia and New Zealand. Not common in Britain, although occurring in many parts of England and Ireland; not known in Scotland. *Fl. spring and summer.*

14. Corn Ranunculus. *Ranunculus arvensis*, Linn. (Fig. 22.)

(Eng. Bot. t. 135.)

An erect, branching, nearly glabrous annual, of a pale green, 6 to 18 inches high. Leaves deeply cut into narrow segments. Flowers small, of a pale yellow. Carpels few, rather large, much flattened, co-



Fig. 22.

vered on both sides with conical, straight or hooked prickles.

A common and troublesome cornfield weed, in central and southern Europe and west central Asia. Very abundant in slovenly farms in southern England, but decreasing northwards. *Fl. and ripens its seed with the corn.*

VII. **CALTHA.** CALTHA.

Glabrous herbs, with a perennial stock and annual stems. Sepals about 5, large and yellow like the petals of *Ranunculus*, but no real petals. Stamens numerous. Carpels 5 to 10, laterally compressed, each with several seeds.

A genus of very few species, inhabitants of temperate and cold regions in both the northern and southern hemispheres.

1. Marsh Caltha. *Caltha palustris*, Linn. (Fig. 23.)

(Eng. Bot. t. 506. *Marsh Marigold*.)



Fig. 23.

A perennial, forming large tufts, with a thick almost tuberous rootstock. Stems about a foot long, erect or decumbent, often rooting at the lower nodes, and but slightly branched. Leaves mostly radical, on long stalks, orbicular or kidney-shaped, cordate at the base and crenate on the margin. Flowers large, of a bright golden-yellow.

In marshy places, the sides of brooks, etc., throughout Europe, northern and central Asia, and northern America. Abundant in Britain. *Fl. spring, commencing early and often lasting till summer.* A small mountain variety, with a more decumbent stem, rooting at the joints, and a smaller flower, has been described as a species, under the name of *C. radicans* (Eng. Bot. t. 2175).

VIII. **TROLLIUS.** TROLLIUS.

Perennial herbs, with divided leaves and yellow flowers. Sepals 5 to 15, large and coloured like petals. Real petals about as many, small, linear, and flat. Stamens numerous. Carpels several, with several seeds in each.

Besides our species, the genus comprises but very few, all from northern Asia or America.

1. **Globe Trollius.** *Trollius europæus*, Linn. (Fig. 24.)

(Eng. Bot. t. 28. *Globeflower*.)

A glabrous, erect plant, 1 to 2 feet high, the stem simple or nearly so. Radical leaves not unlike those of the *meadow Ranunculus*, palmately divided into 3 or 5 segments, which are again lobed and cut. Stem-leaves few, smaller, and nearly sessile. Flowers large, of a pale yellow, with 10 to 15 broad concave sepals converging into a kind of globe, usually concealing the petals, stamens, and carpels.

In moist woods and mountain pastures, in northern and central Europe, and in the great mountain ranges of the South to the Caucasus. Not a common plant generally in Britain, yet pretty frequent from Wales to the Grampians, and in Ireland. *Fl. summer*.

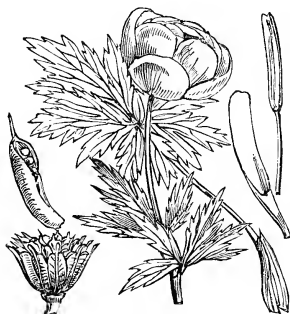


Fig. 24.

IX. **HELLEBORE.** HELLEBORUS.

Perennial herbs, with palmately or pedately divided leaves, of a paler green and more rigid than in most other Ranunculaceous plants. Sepals 5, large, greenish (in the British species), remaining till the fruit is nearly ripe. Real petals 8 to 10, very small, tubular, 2-lobed at the top. Stamens numerous. Carpels several, rather large, each with several seeds.

A well-marked genus, but not numerous in species, chiefly south European and west Asiatic.

Flowers many, in a large panicle, with large ovate bracts.

Sepals converging 2. *Fetid H.*
 Flowers usually 3 or 4. Sepals spreading 1. *Green H.*

The *Winter Aconite* of our gardens, which has been occasionally met with in England, apparently wild, but probably only the remains of cultivation, was formerly considered as a species of *Hellebore*, but now forms the genus *Eranthis*. It is a small plant, with narrow, petal-like, yellow sepals, surrounded by an involucre of green, divided leaves. The white *Christmas Rose* is a true *Hellebore* (*H. niger*), from south-eastern Europe.

1. Green Hellebore. *Helleborus viridis*, Linn. (Fig. 25.)

(Eng. Bot. t. 200.)

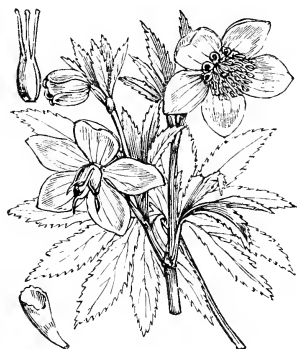


Fig. 25.

Radical leaves large, on long stalks, divided into 7 to 11 oblong, acute, toothed segments, 3 to 4 inches long, the central ones free, the lateral ones on each side connected together at the base so as to form a pedate leaf. Stem scarcely exceeding the leaves, bearing usually 2, 3, or 4 large, drooping flowers, of a pale yellowish green, and at each ramification a sessile leaf, much less divided than the radical ones, and the segments usually digitate.

In pastures and thickets, especially in calcareous soils, and about old walls and ruins in western and central Europe, but not extending to the eastern frontier, nor far to the north. Recorded from many parts of England, but in most cases introduced. It may however be really indigenous in some of the southern and eastern counties. *Fl. early spring.*

2. Fetid Hellebore. *Helleborus fœtidus*, Linn. (Fig. 26.)

(Eng. Bot. t. 613. *Bear's-foot.*)

Lower leaves not all radical, but mostly raised on the short perennial base of the stems, forming a larger and thicker tuft than in the *green H.*, their segments narrower, less toothed, stiffer, and more shining, their outer lobes at a less distance from the central ones. Flower-stem above a foot high, with a large, close panicle of drooping flowers, of a pale green often tinged with purple, the concave sepals giving them a globular form. Bracts at the ramifications of the panicle ovate and entire, or shortly two-lobed at the summit.

In stony places, chiefly in limestone districts, in southern Europe, extending here and there into central Europe, but neither a northern nor an eastern plant. It has been found in several parts of England, and is said to be really wild in Hampshire, but, like the last, it is in most cases an introduced plant. *Fl. early spring.*



Fig. 26.

X. COLUMBINE. AQUILEGIA.

Perennial herbs with the leaves chiefly radical, ternately divided, with distinct stalked segments or leaflets. Sepals 5, coloured. Petals 5, each terminating below in a horn-shaped spur; projecting below the calyx. Stamens numerous. Carpels 5, each with several seeds.

A small but very distinct genus, widely spread over the temperate regions of the northern hemisphere, especially in mountain districts, in the new as well as in the old world.

1. Common Columbine. *Aquilegia vulgaris*, Linn. (Fig. 27.) (Eng. Bot. t. 297.)

Radical and lower leaves in a large tuft, each with a long stalk, once, twice, or even three times ternately divided, the segments broad, 3-lobed, and crenate, of a glaucous-green, glabrous, or with a few hairs underneath. Flower-stem $1\frac{1}{2}$ to 2 feet or more high, bearing a loose panicle with a few leaves at its ramifications much less divided than the lower ones. Flowers large, drooping, blue, or of a dull purple.

In coppices and open woods in central and southern Europe and central Asia, extending northwards into Scan-



Fig. 27.

dinavia. In Britain, often introduced, but now not uncommon, and believed to be really indigenous in several counties of England, Ireland, and southern Scotland. *Fl. early summer.* In our gardens it sports much in the forms and colours assumed by the flowers.

The *Canada C.* (*A. canadensis*), and some other exotic species, are occasionally cultivated in our flower-gardens.

XI. LARKSPUR. DELPHINIUM.

Annual or perennial herbs, with much divided leaves, the segments usually palmate and narrow. Sepals 5, coloured, terminating below in a hollow spur. Petals, in the British species 2, combined into 1, which is lengthened into a spur within that of the calyx; in some exotic species the petals are 4, the two upper ones forming a spur. Carpels 1 to 5, each with several seeds.

A considerable genus, widely spread over the northern hemisphere without the tropics. It is as well marked as the *Columbines* and the *Aconites*, by the peculiar irregularities of the calyx and corolla.

1. Field Larkspur. *Delphinium Consolida*, Linn. (Fig. 28.) (Eng. Bot. t. 1839.)



Fig. 28.

An erect annual, not above a foot high, glabrous or slightly hairy, the branches few and spreading. Radical leaves shortly stalked, the stem ones sessile, all divided into fine, linear, deeply cut segments. Flowers blue, or sometimes reddish or white, not numerous, in loose racemes, forming sometimes an irregular panicle. Spur of the calyx as long as the rest of the flower (each about 6 lines). Petals two only, their appendages united on the under side into an inner spur open along its upper edge. Carpel solitary.

A common weed of cultivation in the greater part of Europe and Russian Asia, and probably of south European origin.

In Britain, abundant only in some of the eastern counties, but appearing occasionally in cornfields in other parts of England. *Fl. with the corn, or later on the stubble.*

The common annual *Larkspur* of our gardens will also occasionally

sow itself. It differs chiefly from the *field L.* in its long dense spike, its shorter spur, and in some marks at the base of the united petals, which have been compared to the letters A I A I, whence the name of *D. Ajacis*. Some larger perennial species are also cultivated in flower-gardens.

XII. **ACONITE.** ACONITUM.

Perennial herbs, with much divided leaves, the segments palmate. Sepals 5, coloured, the upper one helmet-shaped, the two lateral ones broader than the two lower. Petals 2 to 5, concealed within the calyx, the two upper ones forming small and irregular spurred bodies, on long stalks within the upper sepal, the three lower very small and linear, or wanting. Stamens numerous. Carpels 3 to 5, each with several seeds.

A natural genus, consisting chiefly of mountain plants, spread over the greater part of Europe and central Asia, represented also in northern America by a very few species.

1. Common Aconite. *Aconitum Napellus*, Linn. (Fig. 29.)

(Eng. Bot. Suppl. t. 2730. *Aconite*, *Monkshood*, or *Wolfsbane*.)

Stem firm and erect, $1\frac{1}{2}$ to 2 feet high. Leaves stalked, or the upper ones nearly sessile, of a dark green, glabrous or slightly downy, divided to the base into 5 or 7 deeply cut, linear, pointed segments. Flowers large, dark blue, on erect pedicels, forming a handsome, dense, terminal raceme. The upper helmet-shaped sepal at first conceals the lateral ones, but is ultimately thrown back. Spur of the small upper petals short, conical, and more or less bent downwards. Carpels 3, often slightly united at the base.

In moist pastures and thickets and waste places, in mountainous districts, in central and southern Europe and Russian and central Asia, extending northward into Scandinavia. In Britain perhaps only an introduced plant, but apparently wild in some shady places in western England and south Wales. *Fl. summer.*



Fig. 29.

Two or three exotic species are often cultivated in our perennial borders.

XIII. BANEERRY. ACTÆA.

Perennial herbs, with the leaves chiefly radical, their stalk divided, the segments or leaflets distinct. Sepals 4, small, petal-like. Petals 4, small, on distinct claws. Stamens numerous, as long as or longer than the petals, with small anthers. Carpels solitary, becoming a berry when ripe, with several seeds.

A small genus spread over the northern hemisphere, with much of the general habit of *Thalictrum*, but differing in the presence of both sepals and petals, in the anthers and fruit.

1. Common Baneberry. *Actæa spicata*, Linn. (Fig. 30.)

(Eng. Bot. t. 918. *Baneberry*. *Herb Christopher*.)



Fig. 30.

Radical leaves large, not unlike those of several *Umbellifers*, the stalk usually twice divided into 3 or 5 pinnately arranged branches, the segments or leaflets ovate, pointed, often 3-lobed, and coarsely toothed, of a deep green, and quite glabrous. Stem 1 to 2 feet high, with few leaves, much smaller than the radical ones. Flowers small, nearly white, in a short, loose, oblong, terminal raceme. Berries small, nearly black.

In mountain woods and pastures, in central and eastern Europe, Russian Asia, and northern America, extending to the Arctic circle. In Britain very local, and only in northern England. *Fl.* May.

XIV. PÆONY. PÆONIA.

Large perennials, the leaves chiefly radical, with divided stalks and distinct segments or leaflets, the flowers large and handsome. Sepals 5, herbaceous. Petals 5 or more, much larger. Stamens numerous, inserted on a fleshy disk. Carpels 2 to 5, each with several seeds.

A very distinct genus, consisting of but very few species, indigenous in southern Europe and temperate Asia.

1. Common Pæony. *Pæonia officinalis*, Linn. (Fig. 31.)
(*P. corallina*, Eng. Bot. t. 1513.)

Rootstock emitting a cluster of thick tuberous roots, Stem 1 to 2 feet high. Radical leaves twice ternate, the segments ovate, entire or divided into 2 or 3 deep lobes. Flowers deep red. Carpels large and thick, very downy, and, when ripe, more or less recurved.



Fig. 31.

In hilly districts, in southern Europe and central Asia, from the Pyrenees to the Caucasus and Himalaya. Not indigenous to Britain, but appears to have been naturalized in the rocky clefts of the "Steep Holme" Island, in the Severn. *Fl. May or June.* The variety there found is the one usually considered as a species, under the name of *P. corallina*, the name of *P. officinalis* being reserved for some of the garden Pæonies, which are however mostly varieties produced by cultivation. The half-shrubby *Moutan* is a very distinct species, from China.

The *Magnolias* and *Tulip-trees* of our plantations belong to the *Magnolia* family, which has no European representative. They have, like the *Ranunculaceæ*, several distinct sepals, petals, stamens, and pistils, but they are always trees or shrubs, their leaf-buds are enclosed in membranous stipules, and the carpels usually cohere in a kind of cone.

II. THE BARBERRY FAMILY. BERBERIDÆ.

Shrubs or herbs, with alternate or radical leaves, and no stipules. Sepals and petals distinct, 2, 3, 4, 6, or 8 each, but never 5. Stamens the same number as the petals, and opposite to them. Anthers opening by a valve or lid turned upwards. Ovary of a single carpel, with two or more ovules attached to the bottom or to one side of the cavity. Seeds albuminous.

A small family, spread over the temperate regions or tropical mountains of the globe. It is universally admitted by botanists, although the connection between the *Barberry* and the herbaceous genera associated with it appears at first sight rather artificial. There are how-

ever none of them British. The *Epimedium alpinum* (Eng. Bot. t. 438) has indeed been admitted into our Floras as growing in some mountainous spots in the north of England, but, as it is said, only where it had been planted. It is a native of south-eastern Europe. A Japanese *Epimedium* is also cultivated in our gardens.

I. BARBERRY. BERBERIS.

Shrubs, with usually prickly leaves. Sepals, petals, and stamens, 6 each. Fruit a berry.

A rather numerous genus, chiefly Asiatic and American. Many exotic species are cultivated in our gardens, either with simple leaves, like our own, or belonging to a section with pinnated leaves, sometimes considered as a genus, under the name of *Mahonia*.

1. Common Barberry. *Berberis vulgaris*, Linn. (Fig. 32.) (Eng. Bot. t. 49.)

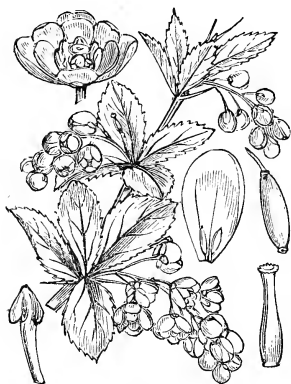


Fig. 32.

A glabrous pale-green shrub, attaining 6 or 8 feet, the branches arched and hanging at the ends, armed with 3-lobed thorns at the base of the tufts of leaves. Leaves alternate or clustered, ovate, rather stiff, sharply toothed. Flowers yellow, in elegant drooping racemes, with a disagreeable smell. Berries small, red, oval or oblong, containing two or three seeds.

In hedges, thickets, and open woods, over the greater part of Europe and temperate Asia, to the Himalaya. In Europe it extends northwards into Scandinavia, but has been so frequently planted, that the real limits of its area cannot be ascertained. Scattered over Britain, but probably not really indigenous. *Fl. spring or early summer.*

III. THE WATERLILY FAMILY. NYMPHÆACEÆ.

Aquatic herbs, with a prostrate submerged rootstock, orbicular or peltate floating leaves, and large solitary flowers. Sepals few. Petals numerous, in several rows, passing gradually into the stamens, which are also very numerous, their anthers adnate.

Carpels numerous, but either imbedded into the receptacle, or combined together so as to form a single ovary with many cells, each terminating in a sessile stigma. Seeds albuminous, in the British genera, with a very small embryo.

Waterlilies, although not numerous in species, are to be found floating on shallow, still, or gently running waters, in almost all parts of the world. They form an exceedingly natural group, of which several are in cultivation in our hothouses, including the gigantic *Victoria*, from tropical America, and the elegant *Nelumbo*, from tropical Asia.

Sepals greenish outside, about the size of the outer (white)

petals 1. NYMPHÆA.

Sepals yellow, concealing the much smaller petals 2. NUPHAR.

I. NYMPHÆA. NYMPHÆA.

Sepals about 4, like the outer petals, but greenish outside. Carpels numerous, imbedded in the thick receptacle so as to form as many cells, radiating from a common centre, whilst the petals and stamens are attached to the outside of the receptacle, nearly as high as the top of the cells. Stigmas as many as the cells, radiating on the surface of the ovary, each one extended into an erect, incurved, linear appendage, whilst the centre of the flower is occupied by the small conical summit of the receptacle. Fruit slightly pulpy, indehiscent.

This genus, generally spread over the globe, includes the greater number of the species of the Order, with white, blue, or red flowers.

1. White Nymphæa. *Nymphæa alba*, Linn. (Fig. 33.)

(Eng. Bot. t. 160. *White Waterlily*.)

Leaves deeply cordate, glabrous, usually about 6 or 8 inches in diameter. Flowers lying on the surface of the water, white, scentless, usually 3 to 4 inches in diameter.

In lakes or still waters, and slow rivers, extending all over Europe and northern and central Asia, although absent from particular localities. Generally distributed in Britain. *Fl. summer*. It may be occasionally seen with smaller flowers, and several varieties have been distinguished by minute but uncertain characters, in the forms of the anthers and stigmatic appendages.



Fig. 33.

II. **NUPHAR.** NUPHAR.

Sepals about 5 or 6, concave, yellow, much larger than the outer petals. Carpels numerous, and radiating as in *Waterlily*, but united into an ovary, raised on the top of the receptacle, and not imbedded in it. Stigmas as many as the cells, their appendages united into a flat disk upon which the stigmas themselves radiate.

The genus, besides the European species, comprises but one North American one.

1. **Yellow Nuphar.** *Nuphar lutea*, Sm. (Fig. 34.)

(Eng. Bot. t. 159. *Yellow Waterlily*.)

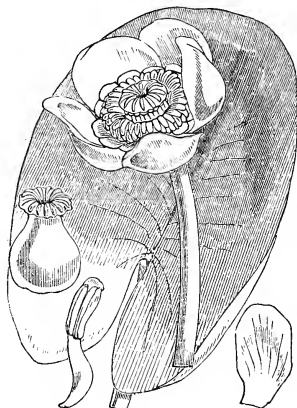


Fig. 34.

Leaves very nearly as in the *white Waterlily*. Flowers yellow, raised two or three inches above the water, much less expanded and faintly scented, the concave sepals assuming a more globular form. Petals and stamens very numerous, but scarcely more than half the length of the sepals. Fruit globular, crowned by the stigmatic disk, indehiscent or bursting irregularly.

Fully as common, and in many places more so, than the *white Waterlily*, with the same geographical range; certainly more general in Britain. *Fl. all summer*. It varies much in size, and in the number of the stigmatic rays. A very small form, with a more indented stigmatic disk, found in the lakes of the north of Scotland, has been distinguished as a species under the names of *N. pumila* and *N. minima* (Eng. Bot. t. 2292).

IV. **THE POPPY FAMILY.** PAPAVERACEÆ.

Herbs, with alternate or radical leaves, usually much divided, and no stipules. Flowers regular. Sepals 2, rarely 3, falling off as the flower expands. Petals (in the European genera 4) crumpled in the bud. Stamens numerous, distinct. Ovary really 1-celled, with several many-seeded parietal placentæ; but these placentæ often project so far into the cavity, as almost, or even quite, to meet in the centre, dividing the ovary into as many im-

perfect cells. Fruit capsular, opening in pores or valves. Seeds albuminous, with a small embryo.

The *Poppy* family belongs almost exclusively to the north temperate zone, in both the old and new world, a single species, the *Mexican Argemone*, or *Prickly Poppy*, having spread as a weed all over the tropics. The combination of 2 sepals and 4 petals easily distinguish the British genera from all other Polyandrous plants.

Ovary and fruit globular or oblong.

Stigmas radiating on a sessile flat disk 1. POPPY.

Stigmas supported on a short but distinct style 2. MECONOPSIS.

Ovary and fruit linear.

Seeds crested. Flowers small, yellow 3. CELANDINE.

Seeds not crested.

Seacoast plant, with thickish leaves and large yellow flowers 5. GLAUCIUM.

Cornfield weed, with rather large violet flowers 4. RŒMERIA.

The Californian *Eschscholtzias*, now so common in our gardens, belong to this family. *Platystemon*, a curious annual from the same country, also not unfrequently cultivated, is intermediate, as it were, between the *Poppy* and the *Ranunculus* families.

I. POPPY. PAPAVER.

Capsule globular, ovoid or slightly oblong, crowned by a circular disk, upon which the stigmas radiate from the centre, internally divided nearly to the centre, into as many incomplete cells as there are stigmas, and opening in as many pores, immediately under the disk. Flowers rather large, red, white, or purplish in the British species, or pale yellow in some exotic ones.

A small genus, extending over Europe and temperate Asia, and introduced among weeds of cultivation into other parts of the world.

Plant glabrous and glaucous. Leaves toothed or slightly

lobed, clasping the stem at their base 1. *Opium P.*

Plant green, usually with stiff hairs. Leaves once or twice pinnately divided.

Capsule glabrous.

Capsule globular 2. *Field P.*

Capsule oblong 3. *Longheaded P.*

Capsule more or less hispid with stiff hairs or bristles.

Capsule nearly globular. Bristles numerous and spreading 4. *Rough P.*

Capsule oblong or obovoid. Bristles few and erect . 5. *Pale P.*

The yellow-flowered *P. nudicaule*, from the mountains of northern and central Europe and Asia, is occasionally cultivated in our gardens.

1. **Opium Poppy.** *Papaver somniferum*, Linn. (Fig. 35.)(Eng. Bot. t. 2145. *Garden Poppy*.)

Fig. 35.

An erect annual of a glaucous green, glabrous, or with a few hairs on the peduncle, scarcely branched, about 2 feet high or more when cultivated. Leaves clasping the stem by their cordate base, oblong, irregularly toothed, and slightly sinuate or lobed. Flowers large, usually of a bluish-white, with a purple base. Filaments slightly dilated at the top. Capsule large, globular, and glabrous.

A native of southern Europe and the Levant, but much cultivated in European gardens, and occasionally establishes itself in waste places. In Britain it assumes the appearance of a wild plant in several parts of England, especially near the sea, and in the fens of the eastern counties. *Fl. summer*. It is the species which supplies *Opium* and

Poppy heads, and in our gardens varies much in the colour of the flowers, which are often very double.

2. **Field Poppy.** *Papaver Rhœas*, Linn. (Fig. 36.)

(Eng. Bot. t. 645.)



Fig. 36.

An erect, branched, annual, 1 to 2 feet high or rarely more, with stiff spreading hairs or bristles. Lower leaves large, stalked, once or twice pinnately divided, the lobes lanceolate, pointed and more or less cut. Flowers large, of a rich scarlet, with a dark eye, the filaments of the stamens not dilated. Capsule perfectly smooth, globular, or slightly top-shaped, with 10 or more stigmatic rays.

In waste and cultivated places, in central and southern Europe and western Asia, disappearing in the north. In Britain chiefly a cornfield weed, abundant in England and Ireland, less so in Scotland, and scarce in the Highlands. *Fl. all summer*. Double-flowering varieties are often cultivated.

3. Long-headed Poppy. *Papaver dubium*, Linn. (Fig. 37.)

(Eng. Bot. t. 644.)

Very near the *field P.*, but generally smaller and more slender, the leaves more cut, with narrower lobes, the hairs less spreading, and the flowers rather smaller. It is also more essentially distinguished by the capsule, which is oblong, often twice as long as broad, narrowed at the base, with fewer stigmatic rays.

In waste and cultivated places in Europe and western Asia, extending further north than the *field P.*, but not so generally common. In England and Ireland less frequent, but in Scotland said to be more so than the *field P.* *Fl. summer.*



Fig. 37.

4. Rough Poppy. *Papaver hybridum*, Linn. (Fig. 38.)

(Eng. Bot. t. 43.)

Nearly as tall as the *field P.*, but generally less branched, the leaves smaller, with stiffer and shorter segments, the hairs few and short. Flowers smaller, of a purplish red, usually with a dark spot in the centre. Filaments of the stamens dilated from the middle upwards. Capsule nearly globular, covered with stiff spreading bristles a little turned upwards at their points.

In waste and cultivated places in central and southern Europe to the Caucasus, disappearing in northern Germany. In Britain rather rare, chiefly in sandy or chalky fields in England and Ireland. *Fl. summer.*



Fig. 38.

5. Pale Poppy. *Papaver Argemone*, Linn. (Fig. 39.)

(Eng. Bot. t. 643.)

The weakest, and often the smallest of our red Poppies, the segments



Fig. 39.

of the leaves few and narrow, and flowers rather small, of a pale red, often with a dark spot. Filaments of the stems dilated as in the *rough P.* Capsule oblong, contracted at the base, bearing, especially towards the top, a few stiff hairs or bristles, more erect from the base than in the *rough P.*

Stations and geographical range about the same as those of the *field P.*, but much less common in Britain and central Europe. *Fl. summer.*

II. MECONOPSIS. MECONOPSIS.

Ovary ovoid, with a short but distinct style, and a slightly dilated stigma of 4 to 6 rays. Capsule opening at the top in as many short valves, the placentas inside lining the cavity, but not projecting to the centre.

A small genus, containing besides the European species, a few others, from central Asia and north-western America.

1. Welsh Meconopsis. *Meconopsis cambrica*, Vig. (Fig. 40.) (*Papaver*, Eng. Bot. t. 66. *Welsh Poppy*.)

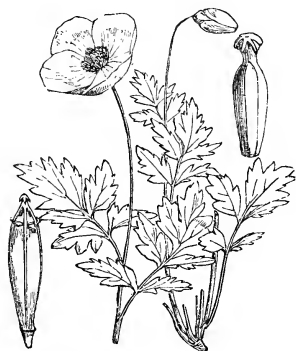


Fig. 40.

Stock perennial, forming, when old, large tufts, with thick, tapering roots. Stems erect, about a foot high. Leaves on long stalks, pale green and slightly hairy, pinnate, the segments distinct or slightly decurrent along the leafstalk, ovate or lanceolate, toothed or pinnately lobed. Flowers rather large, pale yellow, on long peduncles. Capsules narrow ovate or oblong, glabrous.

In rocky woods and shady places, in the hilly districts of western Europe, from Spain to Ireland, Wales, and a few of the western counties of England. *Fl. summer.*

III. **CELANDINE.** CHELIDONIUM.

Ovary linear, ending in a short style, with a small, slightly 2-lobed stigma. Capsule long and linear, opening from the base upwards in two valves, the placentas inconspicuous. Seeds with a small crest-like appendage next the hilum.

A genus now reduced to a single species.

1. **Common Celandine.** *Chelidonium majus*, Linn. (Fig. 41.)

(Eng. Bot. t. 1581.)

Rootstock perennial. Stems erect, slender, branching, 1 to 2 feet high, full of a yellow fetid juice, and generally bearing a few spreading hairs. Leaves thin, glaucous underneath, once or twice pinnate, the segments ovate, coarsely toothed or lobed, the stalks often dilated into a kind of false stipules. Flowers small and yellow, 3 to 6 together, in a loose umbel, on a long peduncle. Pod nearly cylindrical, glabrous, $1\frac{1}{2}$ to 2 inches long.

On roadsides and waste places, throughout Europe and Russian Asia, except the extreme north. In Britain, chiefly near villages and old ruins. Frequent in England and some parts of Ireland, less so in Scotland. *Fl. all summer.*



Fig. 41.

IV. **RŒMERIA.** RŒMERIA.

Ovary linear, with a sessile stigma of 3 or 4 short rays. Capsule long and linear, opening from the summit downwards in 3 or 4 valves, the placentas inconspicuous. Seeds without any crest-like appendage.

A genus of two or three species, from the east Mediterranean region, perhaps all mere varieties of one.

1. **Common Rœmeria.** *Rœmeria hybrida*, DC. (Fig. 42.)

(*Chelidonium*, Eng. Bot. t. 201.)

An annual very much resembling the *pale Poppy* in habit and fo-



Fig. 42.

liage, and in its pale purplish flowers, but differing widely in its linear capsule, $1\frac{1}{2}$ to 2 or 3 inches long, bearing a few erect, stiff hairs, and not divided into cells inside.

A Mediterranean species, appearing occasionally as a cornfield weed in central Europe, and said to be established as such in Cambridgeshire. *Fl. with the corn.*

V. GLAUCIUM. GLAUCIUM.

Ovary linear, contracted at the top into a 2-lobed stigma. Capsule linear, opening in 2 valves, leaving 2 free linear placentas, forming a thin, dry, spongy substance, in which the seeds are more or less imbedded.

The very few species comprised in the genus besides the British one, are from the Mediterranean region.

1. **Yellow Glaucium.** *Glaucium luteum*, Scop. (Fig. 43.)
(*Chelidonium Glaucium*, Eng. Bot. t. 8. *Horned Poppy. Sea Poppy.*)



Fig. 43.

A stout annual, with hard spreading branches, very glaucous in all its parts. Leaves thick, the radical ones stalked, pinnately lobed or divided, the lobes ovate or lanceolate, sinuate or lobed, rough with short thick hairs; the upper ones shorter, broader, less divided, and smoother. Flowers on short peduncles, large and yellow, the petals very fugacious. Pods 6 to 10 or 12 inches long, crowned by the spreading lobes of the stigma.

On sandy seashores, common all round the Mediterranean, and up the western coast of Europe to Scandinavia. Frequent on the coasts of England and Ireland, but decreasing much in Scotland. *Fl. summer.*

V. THE FUMITORY FAMILY. FUMARIACEÆ.

Delicate glabrous herbs, either annual or with a perennial root-stock; the leaves much divided into distinct segments, and no stipules. Flowers very irregular. Sepals 2, small and scale-like. Petals 4, in two pairs, the two outer united at the base and often one or both spurred; the two inner narrow, their crested tips united over the stigma. Stamens 6, hypogynous, united into 2 sets of 3 each, the middle anther of each set having 2 cells, the lateral ones 1 cell each. Ovary of a single cell, with 2 placentas and several ovules, at least in a very young stage. Fruit a 1-seeded nut, or a pod with several seeds. Embryo small, at the base of the albumen.

A small family, spread over the temperate regions of the northern hemisphere, scarcely penetrating into the tropics, but reappearing in southern Africa. It may be considered as a tribe of the *Poppy* family, with which it agrees in the parts of the flower being in twos and in the structure of the ovary, but differs in the irregular flowers and definite stamens.

Fruit a small roundish nut with one seed 1. FUMITORY.
Fruit an elongated pod with several seeds 2. CORYDAL.

Some species of *Dicentra* or *Dielytra*, a North American and east Asiatic genus, are cultivated for the beauty of their flowers.

I. FUMITORY. FUMARIA.

One of the outer petals has a pouch or spur at its base. Fruit a small roundish green nut with a single seed, although the very young ovary is said to have three or four ovules, of which one only remains at the time of flowering.

A genus of very few species, all apparently indigenous to the Mediterranean region, although the common one is now so widely spread over the globe.

1. Common Fumitory. *Fumaria officinalis*, Linn. (Fig. 44.)

(Eng. Bot. t. 589.)

A delicate annual, perfectly glabrous, and of a pale green colour, usually forming, when it commences flowering, a dense tuft of a few inches in height, but the stem will often grow out to the length of from 1 to 2 or 3 feet; it is then generally weak or trailing, and sometimes slightly climbing, supported by the twisted petioles. Leaves much divided

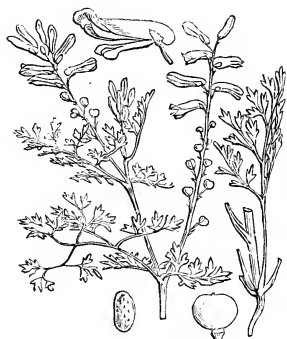


Fig. 44.

into numerous segments, generally 3-lobed, the lobes varying in shape from narrow-linear to broadly lanceolate or oblong. Flowers in racemes of 1 to 2 inches, either terminal or opposite the leaves, dense at first, but often lengthening much as the flowering advances. Pedicels short, in the axil of a very small, scale-like, white or coloured bract. Sepals small, white, or coloured like the bracts, and often toothed. Petals oblong-linear, closed so as to form a tubular corolla, with dark-coloured tips, the spur at the base giving it the appearance of being attached laterally to the pedicel.

Nut usually about a line in diameter, not quite globular, being somewhat compressed laterally.

Common in cultivated and waste places in Europe and central Asia, disappearing at high northern latitudes, but carried out as a weed of cultivation to many parts of the globe. Abundant in England and southern Scotland, but decreases much in the north. *Fl. all summer and autumn.* It varies much in the form of the leaf-segments, in the size and colour of the flower, white or red, in the size and shape of the sepals, and in the precise shape of the nuts; and several distinct species are generally admitted, but they run so much one into another, that there is every probability of their being mere varieties. The most prominent British forms are—

a. *Rampant Fumitory* (*F. capreolata*, Eng. Bot. t. 943). A large luxuriant form, attaining a length of 2 or more feet; leaflets broad; flowers 4 or 5 lines long, white or pale red, the sepals rather large, the nut nearly orbicular. About hedges and walls, much more common and more marked in southern Europe than in Britain.

b. *Common Fumitory.* Leaf-segments neither very broad nor very narrow; flowers red, about 3 lines long; nuts very blunt, or even depressed at the top, rather broader than long. Connected both with the preceding and the following by numerous intermediates, some of which are considered as species under the names of *F. media*, *F. agraria*, etc.

c. *Close-flowered Fumitory* (*F. densiflora* or *F. micrantha*, Eng. Bot. Suppl. t. 2876). Leaf-segments usually small; flowers smaller and in closer racemes than in the common variety, the sepals remarkably large in proportion to the corolla. Not uncommon in southern Europe, and scattered here and there over Britain and other parts of the area of the species.

d. *Small Fumitory* (*F. parviflora*, *Vaillantii*, etc., Eng. Bot. t. 590,

and Suppl. t. 2877). Leaf-segments narrow; flowers scarcely 2 lines, white, or rarely red, sepals very small, sometimes quite minute. Very common in hot countries; rare, but occasionally met with in Britain.

II. CORYDAL. CORYDALIS.

One of the outer petals has a pouch or spur at the base as in *Fumitory*, but the fruit is a narrow pod, opening in two valves and containing several seeds, bearing near their hilum a little crest-like appendage.

The species are rather numerous, spread over Europe, Russian and central Asia, and northern America. The two British ones belong to the section *Capnoides*, in which the stems are branched and leafy, without tubers to the root. The *bulbous* *C.* (*C. solida*, Eng. Bot. t. 1471), from continental Europe, often met with in our flower-gardens, has occasionally remained from cultivation in groves and shady places in some parts of England. It is a small plant, with a tuberous rootstock, simple stems, and rather large purplish flowers, belonging to the section *Bulbocapnos*.

Stems short, erect, much branched. Flowers yellow . . . 1. *Yellow C.*
Stem long, slender, climbing. Flowers whitish . . . 2. *Climbing C.*

1. Yellow Corydal. *Corydalis lutea*, DC. (Fig. 45.)

(*Fumaria*, Eng. Bot. t. 588.)

An erect or spreading plant 6 or 8 inches high, either annual or forming a tufted stock of several years' duration. Leaves delicate and pale green, much divided, the segments ovate or wedge-shaped, and cut into two or three lobes. Flowers in short racemes, pale yellow, about 6 lines long, with a short broad spur. Pod 3 or 4 lines long.



Fig. 45.

In stony places, in southern Europe, but having been long cultivated in flower gardens, it has become naturalized on old walls and rubbish much further to the north, on the continent of Europe, as well as in some parts of England. *Fl. summer.*

2. Climbing Corydal. *Corydalis claviculata*, DC. (Fig. 46.)

(*Fumaria*, Eng. Bot. t. 103.)

An annual with slender intricate stems, 1 to 2 feet long, climbing by



Fig. 46.

means of the leaf-stalks, which usually terminate in delicate tendrils. Leaf-segments small, ovate or oblong, and often toothed or cut. Racemes or spikes short and compact at the extremity of the peduncles.

Flowers small, white, with a slight yellow tinge, and a very short spur. Pod 2 or 3 lines long.

In hilly districts and stony situations, in western Europe, penetrating eastward into northern Germany, and here and there along the Mediterranean. Widely distributed over Britain, but not common, except in some parts of western and northern England, Ireland, and southern Scotland. *Fl. summer.*

VI. THE CRUCIFER FAMILY. CRUCIFERÆ.

Herbs, or rarely undershrubs, with alternate leaves and no stipules; the flowers in terminal racemes, which are generally very short or reduced to a corymb when the flowering commences, but lengthen out as it advances. Sepals 4. Petals 4, equal, or two (on the outer side) larger. Stamens 6, of which two are generally shorter or very rarely deficient. Ovary solitary, 2-celled. Style single, often very short or almost none, with a capitate or 2-lobed stigma. Fruit a pod, divided into 2 cells by a thin partition, from which the valves generally separate at maturity; or, in a few genera, the pod is one-celled or indehiscent, or separates transversely into several joints. Seeds without albumen, attached, in each cell, alternately, to the right and left edges of the partition.

An extensive and very natural family, widely spread over the globe, but chiefly in the northern hemisphere; scarce within the tropics, and in some districts entirely unknown. The number of sepals, petals, and stamens readily distinguish *Crucifers* from all other British plants, but the discrimination of the numerous genera into which they are distributed is a much more difficult task. The characters are necessarily derived chiefly from the pod and the seed, and are often very minute. It is therefore absolutely necessary, in order to name a *Crucifer*, to have the specimen in fruit, and to examine the seed it must be ripe; it should then be soaked and the outer coating carefully taken off, in

order to lay bare the embryo, and observe the position of the radicle on the cotyledons, which is now considered as the most essential among the generic characters.

A few terms specially made use of in describing plants of this family may require some explanation. The calyx is said to be *bisaccate* when two of the sepals, a little outside the two others, are broader at the base, forming little protuberances or pouches. The pod is termed a *siliqua* or *siliquose* when linear, at least three or four times as long as broad; a *silicule* or *siliculose* when short and broad—not twice as long as broad; and a *lomentum* or *lomentose* when it does not open in valves. The nerves on the pod, often used as a generic character, can be best seen on dried specimens; they are even sometimes quite imperceptible on the fresh pod. The seeds are said to be *in one row* when, from the narrowness of the pod or the length of the seed-stalk, they occupy the centre of the cell, the two rows being as it were blended into one; or *in two rows*, when the two rows are distinct without overlapping each other. In the embryo, the radicle is said to be *accumbent* when it is bent down on the edge of the cotyledons, *incumbent* when bent over the back of one of them; in the latter case the cotyledons are either flat or *conduplicate*, that is, folded longitudinally over the radicle.

It must be admitted, however, that, notwithstanding all these nice distinctions, the genera of *Crucifers*, as at present defined, are often as artificial as they are difficult. But as the remodelling them is not a work to be undertaken in a local Flora, I have selected, from those adopted in the best modern Floras, such as have appeared to me the most natural. The following Table is founded, as much as possible, on less minute characters, but even in the few British species it is feared that the examination of the seed cannot always be wholly dispensed with.

1	{	Pod with a longitudinal partition, generally opening in two valves . . .	2
		Pod not dehiscent, with one seed, or with several seeds placed end to end and separated by transverse partitions (LOMENTOSE) . . .	30
2	{	Pod at least 3 or 4 times as long as broad (SILIQUESE).	3
		Pod not 3 times as long as broad (SILICULOSE)	15
3	{	SILIQUESE { Flowers white, purple, or red (never yellow)	4
		Flowers yellow	11
4	{	Petals large, on long claws, purple or rarely white. Stigmas 2, very short, erect and parallel	5
		Petals small, or the claws scarcely longer than the calyx. Stigma entire	6
5	{	Leaves hoary and soft. Stigmas thickened at the base. (Cotyledons accumbent)	1. STOCK.
		Leaves green, with coarse hairs. Stigmas not thickened. (Cotyledons incumbent)	8. HESPERIS.
6	{	Leaves all undivided	7
		Leaves, at least the lower ones, pinnate	8

- 7 { Leaves all stalked, large and broad 10. ALLIARIA.
 { Upper leaves sessile or auricled 5. ROCKCRESS.
 { Seeds in two distinct rows in each cell. Pod rather short and curved.
 8 { 4. WATERCRESS.
 { Seeds blended into one row in each cell. Pod straight, long, or
 slender 9
 9 { Stem-leaves undivided, narrow at the base 5. ROCKCRESS.
 { Leaves all pinnate or divided 10
 { Pod linear. Leaves without bulbs 6. BITTERCRESS.
 10 { Pod lanceolate-linear. Leaves usually with bulbs in their axils.
 { 7. TOOTHCRESS.
 { All the leaves entire, or toothed only. Plant pale or hoary with
 minute appressed hairs 12
 11 { Leaves, at least the lower ones, pinnate or lobed at the base. Plant
 glabrous, or hairy with rough or spreading hairs 13
 12 { Pod flattened. Cotyledons accumbent 2. WALLFLOWER.
 { Pod nearly quadrangular. Cotyledons incumbent . . . 11. ERYSIMUM.
 { Cotyledons accumbent. Pods ending in a style seldom above a line
 long. Plant glabrous, with lyrate or pinnate leaves 14
 { Cotyledons incumbent. Valves of the pod opening to close under the
 stigma. Plant hairy or glabrous, the leaves deeply pinnate.
 13 { 9. SISYMBRIUM.
 { Cotyledons conduplicate. Pod ending in a beak or conical style, 1 to
 6 lines long. Leaves irregularly pinnate, or lyrate, or the upper ones
 undivided 12. BRASSICA.
 14 { Pods not 6 lines long, on slender spreading pedicels . . 4. WATERCRESS.
 { Pods an inch or more, on stiff short pedicels 3. WINTERCRESS.
 15 SILICULOSE { Pod globular or oblong, or compressed. The valves
 flat or convex, parallel to the *broad* partition . . . 16
 { Pod compressed or flattened laterally, at right angles to
 the *narrow* partition. The valves boat-shaped . . . 23
 16 { Pod nearly globular or cylindrical 17
 { Pod evidently compressed or flattened 21
 17 { Minute aquatic plant with subulate leaves 17. AWLWORT.
 { Terrestrial plant with flattened leaves 18
 18 { Flowers white. Cotyledons accumbent 19
 { Flowers yellow 20
 19 { Plant glabrous. Pod globular or shortly ovoid . . . 13. COCHLEARIA.
 { Plant hoary or rough with short hairs. Pod somewhat flattened or oblong.
 { 14. ALYSSUM.
 { Leaves pinnately lobed, or, if entire, narrowed at the base. (Coty-
 ledons accumbent.) 4. WATERCRESS.
 20 { Leaves linear, in dense radical tufts. Flower-stems leafless. 15. DRABA.
 { Leaves entire or toothed, the upper ones auricled and clasping the
 stem. (Cotyledons incumbent.) 16. CAMELINA.
 21 { Petals deeply divided. (Dwarf annual.) 15. DRABA.
 { Petals entire or notched 22

- 22 { Pod nearly orbicular 14. *ALYSSUM*.
 { Pod considerably longer than broad 15. *DRABA*.
 23 { Two or more seeds in each cell of the pod 24
 { One seed only in each cell 28
 24 { Leaves entire 25
 { Leaves more or less pinnate 26
 25 { Pod winged all round. (Cotyledons accumbent.) . . 18. *PENNYCRESS*.
 { Pod obcordate or wedge-shaped, not winged. (Cotyledons incumbent.)
 22. *CAPSEL*.
 26 { Two seeds in each cell 27
 { Many seeds in each cell. (Cotyledons incumbent.) . . 22. *CAPSEL*.
 27 { Pod slightly winged, orbicular. (Cotyledons accumbent.) 19. *TEESDALIA*.
 { Pod not winged, oval. (Cotyledons oblique.) 21. *HUTCHINSIA*.
 28 { Pod opening in two valves. Upper leaves undivided 29
 { Pod indehiscent, or separating laterally into two nuts. Trailing plant,
 with all the leaves pinnate 24. *SENEBIERA*.
 29 { Two adjoining outer petals much larger than others . . 30. *CANDYTUFT*.
 { Petals all equal 23. *CRESS*.
 30 *LOMENTOSE* { Pod flattened 31
 { Pod globular, cylindrical, or conical 32
 31 { Pod oblong, pendulous. Tall plant, with yellow flowers . . 25. *WOAD*.
 { Pod small, broad. Trailing plants, with small white flowers 24. *SENEBIERA*.
 { Pod globular, one-seeded, raised on a short, thick stalk within the calyx.
 27. *CRAMBE*.
 32 { Pod of two joints, the upper mitre-shaped and one-seeded, the lower
 spike-shaped, with an imperfect ovule 26. *CALILE*.
 { Pod of several seeds, separated by transverse partitions . . 28. *RADISH*.

These genera are distributed into the following Tribes:—

1. *ARABIDÆE*. Pod siliquose. Cotyledons accumbent. *Genera*:—1. *STOCK*;
 2. *WALLFLOWER*; 3. *WINTERCRESS*; 4. *WATERCRESS*; 5. *ROCKCRESS*; 6.
BITTERCRESS; 7. *TOOTHCRESS*.
2. *SISYMBRIÆE*. Pod siliquose. Cotyledons incumbent. *Genera*:—8.
HESPERIS; 9. *SISYMBRIUM*; 10. *ALLIARIA*; 11. *ERYSIMUM*.
3. *BRASSICÆE*. Pod siliquose. Cotyledons conduplicate. *Genus*:—12.
BRASSICA.
4. *ALYSSINÆE*. Pod siliculose, the partition across the broadest diameter.
 Cotyledons accumbent. *Genera*:—13. *COCHLEARIA*; 14. *ALYSSUM*; 15.
DRABA.
5. *CAMELINÆE*. Pod siliculose, the partition across the broadest diameter.
 Cotyledons incumbent. *Genera*:—16. *CAMELINA*; 17. *AWLWORT*.
6. *THLASPIDÆE*. Pod siliculose, the partition across the narrowest diameter.
 Cotyledons accumbent. *Genera*:—18. *PENNYCRESS*; 19. *TEESDALIA*; 20.
CANDYTUFT.
7. *LEPIDINÆE*. Pod siliculose, the partition across the narrowest diameter.
 Cotyledons incumbent, or nearly so. *Genera*:—21. *HUTCHINSIA*; 22. *CAPSEL*;
 23. *CRESS*; 24. *SENEBIERA*.

8. LOMENTOSÆ. Pod lomentose. *Genera*:—25. WOAD; 26. CAKILE; 27. CRAMBE; 28. RADISH.

Several European and Asiatic Crucifers belonging to other genera are cultivated in our gardens; among them the most common are the *Honesty* (*Lunaria*) and an Eastern species of *Aubrietia*, both belonging to the *Alyssineæ*.

I. STOCK. MATTHIOLA.

Annuals or perennials, more or less hoary, the leaves entire or sinuate, the flowers rather large, usually purple, never yellow. Calyx erect, distinctly bisaccate. Petals spreading, on long erect claws. Pod long and narrow, compressed or nearly cylindrical. Stigmas sessile, short, but erect, and parallel to each other, having sometimes a horizontal horn at the base of each. Seeds more or less flattened, usually surrounded by a narrow wing, forming one row. Radicle accumbent.

Mostly seacoast plants from the shores of western Europe and the Mediterranean. They formerly formed one genus with the *Wall-flowers*, from which they are chiefly distinguished by the erect stigmas, and the colour of the flowers.

Stem erect, much branched. Leaves entire 1. *Common S.*
Stem spreading. Lower leaves sinuate, or coarsely toothed . 2. *Sea S.*

1. Common Stock. *Matthiola incana*, Br. (Fig. 47.)

(*Cheiranthus*, Eng. Bot. t. 1935. *Stock*. *Gilliflower*.)

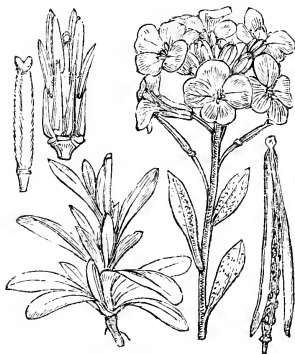


Fig. 47.

An erect herb, usually perennial, and almost woody at the base, but not of long duration, 1 to 2 feet high, with hard, slightly spreading branches. Leaves oblong-linear, obtuse, quite entire, soft and hoary on both sides with short crisped hairs. Flowers purple or reddish, rather large, the petals obovate. Pod 4 or 5 inches long, crowned by short stigmas, which are rather thickened at the base.

On cliffs and stony places on the seacoast, round the Mediterranean, and up western Europe, at least to Bayonne.

In Britain fully established as a wild plant on cliffs in the Isle of Wight, and perhaps some other parts of the south coast, although probably originally escaped from cultivation.
Fl. summer.

2. Sea Stock. *Matthiola sinuata*, Br. (Fig. 48.)

(*Cheiranthus*, Eng. Bot. t. 462.)

Like the last, a perennial of short duration, and covered all over with a short hoary down, which is however much softer and more dense. Branches very spreading. Lower leaves deeply sinuate. Flowers nearly as in the *common S.*, but the pods more compressed, usually more or less covered with glandular protuberances, and the stigmas very short, scarcely thickened at the base.

On sandy seashores, common all round the Mediterranean, and up the west coast of Europe to Ireland, and many points of the south and west coasts of England and Wales. *Fl. summer.*



Fig. 48.

II. WALLFLOWER. CHEIRANTHUS.

Habit and character of the *Stock*, except that the flowers are orange or yellow, the pod more distinctly flattened, the very short stigmas spreading horizontally, not erect, and usually borne on a distinct style, and the seeds not winged.

The genus is reduced by some to a single species, by others made to include also a very few species from southern Europe and the Canary Islands.

1. Common Wallflower. *Cheiranthus Cheiri*, Linn. (Fig. 49.)

(*C. fruticosus*, Eng. Bot. t. 1934. *Wallflower. Gilliflower.*)

A perennial of longer duration and more woody than the *common Stock*, more branched and less hoary, the hairs forked at the base, and closely pressed on the surface, or often quite green and nearly glabrous. Leaves narrow, pointed, quite entire. Flowers rather large, generally of a rich orange yellow, and sweet-scented, but varying from pale yellow to a deep red. Pods 2 to 3 inches long, the valves marked by a slightly prominent midrib.



Fig. 49.

A native of rocky situations, in southern Europe, but spreads rapidly from cultivation, and is now abundant, apparently wild, on walls, old buildings, and rocky places near habitations, in many parts of central and even northern Europe. In Britain very frequent under similar circumstances. *Fl. spring.*

III. WINTERCRESS. BARBAREA.

Herbs, only differing from the yellow-flowered *Watercresses* by their longer pod, the midrib more conspicuous, and the seeds apparently arranged in a single row, and from *Erysimum* and *Sisymbrium* in the radicle accumbent on the edge of the cotyledons, not incumbent on the back of one of them.

A small genus, generally spread over temperate regions of the globe.

1. Common Wintercress. *Barbarea vulgaris*, Br. (Fig. 50.) (*Erysimum Barbarea*, Eng. Bot. t. 443. *Wintercress*. *Yellow Rocket*.)



Fig. 50.

A perennial of short duration, stiff and erect, green and glabrous, sparingly branched, 1 to 2 feet high. Leaves mostly pinnate, with the terminal lobe large, broad, and very obtuse, whilst the lower ones are few, small and narrow; very rarely all the lobes are narrow, or some of the leaves oblong and undivided, but deeply toothed at the base. Flowers rather small, bright yellow. Pods usually very numerous, erect or slightly spreading, and crowded in a long dense raceme, each one from $\frac{3}{4}$ to 2, or even 3 inches long, terminated by an erect, usually pointed style, varying from $\frac{1}{2}$ a line to 2 lines in length.

Hedges, or pastures and waste places, common all over Europe, in Russian Asia and northern America. Frequent in Britain. *Fl. spring and summer.* It varies much in the relative size of the lobes of the leaves, in the size of the flowers, in the length and thickness of the pod, in the length of the style, etc. A form with a very

short and thick style, is often considered as a species, under the name of *B. præcox* (Eng. Bot. t. 1129), but it passes by every gradation into those which have a pointed style of 2 lines, and which have again been distinguished under the name of *B. stricta*.

IV. WATERCRESS. NASTURTIIUM.

Glabrous perennials or annuals, with the leaves often pinnate, or pinnately lobed, and small white or yellow flowers. Calyx rather loose. Stigma capitate, nearly sessile. Pod linear or oblong, and usually curved, or in some species short like a silicule, the valves very convex, with the midrib scarcely visible. Seeds more or less distinctly arranged in two rows in each cell, and not winged. Radicle accumbent on the edge of the cotyledons.

A small genus, but widely spread over the whole area of the family. It differs from *Sisymbrium* only in the position of the radicle in the embryo; and the white-flowered species are only to be distinguished from *Bittercress* by the seeds forming two distinct rows in each cell of the pod.

Pod usually half an inch long or more.

Flowers white 1. *Common W.*

Flowers yellow 2. *Creeping W.*

Pod usually $\frac{1}{4}$ inch long or less. Flowers yellow.

Pod oblong, curved. Petals scarcely longer than the calyx . . . 3. *Marsh W.*

Pod ovoid, straight. Petals longer than the calyx . . . 4. *Great W.*

1. *Common Watercress. Nasturtium officinale*, Br. (Fig. 51.)

(*Sisymbrium Nasturtium*, Eng. Bot. t. 855.)

Stem much branched, sometimes very short and creeping, or floating in shallow water; sometimes scrambling on banks or bushes to the length of 2 feet or more. Leaves pinnate, with distinct segments, the terminal one usually longer, ovate or orbicular. Flowers small and white, in short racemes. Pods about 6 or 8 lines long or rather more, on spreading pedicels, but slightly curved upwards, the double rows of the seeds very distinct.

Along brooks and rivulets, throughout Europe and Russian Asia, except the extreme north, and naturalized in North America and some other countries. Abundant in Britain except in some of the Scotch Highlands. *Fl. the whole summer.*

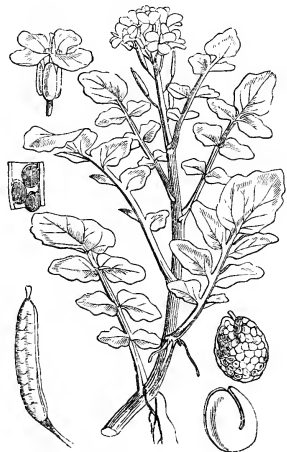


Fig. 51.

2. **Creeping Watercress.** *Nasturtium sylvestre*, Br.
(Fig. 52.)

(*Sisymbrium*, Eng. Bot. t. 2324.)

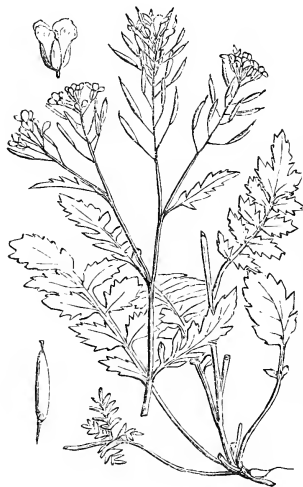


Fig. 52.

Stem creeping at the base, the flowering branches erect or ascending, a foot high or more. Leaves all or most of them deeply pinnatifid or almost pinnate, the lower lobes distinct and narrow, the terminal one often larger and broader. Flowers yellow and small, although the petals are considerably longer than the calyx. Pod nearly that of the *common W.*, but rather more slender, and the two rows of seeds rather less distinct.

On river-banks and in wet places, distributed over Europe and Russian Asia, but apparently not so far north as the *common W.* Sparingly scattered over England and Ireland, and still more rare in Scotland. *Fl. summer.*

3. **Marsh Watercress.** *Nasturtium palustre*, DC. (Fig. 53.)

(*Sisymbrium terrestre*, Eng. Bot. t. 1747. *Nasturtium terrestre*,
Brit. Fl. *Yellow Cress.*)

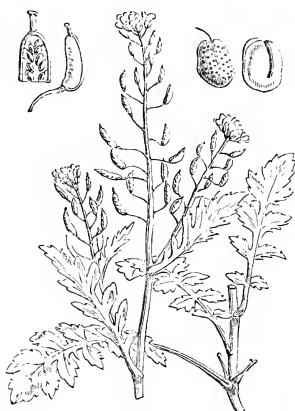


Fig. 53.

Much resembles the *creeping W.*, but usually weaker and not so tall, the lobes of the leaves rather broader and more toothed, the petals seldom exceed the calyx, and the pod is seldom above 3 lines long, slightly curved, the seeds much crowded, in two distinct rows in each cell.

In muddy and watery places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, in North America, and in Australia. Pretty frequent in England and Ireland, but decreasing considerably in Scotland. *Fl. summer and winter.*

4. Great Watercress. *Nasturtium amphibium*, Br. (Fig. 54.)
 (*Sisymbrium*, Eng. Bot. t. 1840. *Armoracia*, Brit. Fl. *Yellow Cress*.)

A taller and more erect plant than either of the two preceding, attaining 2 or 3 feet. Leaves less divided, sometimes narrow lanceolate, 3 to 4 inches long, and only slightly toothed, more frequently deeply toothed or pinnately lobed, sometimes divided to the midrib into narrow segments. Flowers yellow, larger than in the two last, the petals longer than the calyx. Pod straight, elliptical, about 2 lines long, or sometimes shorter and almost globular, the style much longer than in the other species.



Fig. 54.

In moist meadows and watery places, throughout Europe and Russian Asia. Generally distributed over England, Ireland, and southern Scotland, but not very common. *Fl. summer*. The shortness of the pod in this and some varieties of the *marsh W.* has induced some botanists to remove them to *Siliculosæ*, and associate them with the *Horseradish* in the genus *Armoracia* or *Roripa*, a junction which appears purely artificial.

V. ROCKCRESS. ARABIS.

Annuals or perennials, usually erect and hairy, at least at their base, with a spreading tuft of radical leaves, which are occasionally lobed, the stem-leaves undivided, sessile or stem-clasping; the flowers white, or, in a few exotic species, purple. Pods long and linear, the stigma nearly sessile, the valves flat or slightly convex, often marked with a distinct midrib or several longitudinal veins. Seeds more or less flattened, often winged. Radicle accumbent on the edge of the cotyledons or rarely obliquely incumbent.

A numerous genus, spread over the temperate regions of the northern hemisphere, with a few extratropical species in the southern one.

Stem-leaves undivided, rounded, or auricled at the base.

Tall plants with pods 3 inches or more long.

Ripe pods erect or spreading. Plant glabrous.

Auricles of the leaves pointed. Pods numerous,

erect, crowded, the valves flat 1. *Glabrous R.*

- Auricles of the leaves rounded. Pods loosely spreading, valves with a prominent midrib . . . *Eastern Erysimum*.
 Ripe pods turned downwards. Plant usually hairy . . . 2. *Tower R.*
Plant seldom above a foot. Pod seldom 2 inches long.
 Upper leaves clasping the stem 3. *Hairy R.*
 Upper leaves sessile, but not clasping the stem.
 Nearly simple perennial, with erect pods . . . 4. *Fringed R.*
 Slender branching annual, with spreading pods . . . 5. *Thale R.*
 Stem-leaves narrowed at the base, the lower often pinnately lobed.
 Stems nearly simple. Radical leaves hispid, in a close tuft 6. *Bristol R.*
 Stems branching at the base, in a loose tuft 7. *Northern R.*

Arabis albida or *grandiflora*, a south Russian species or variety of the *A. alpina*, is common in our gardens among the early-flowering perennials. The *eastern Erysimum*, which might be mistaken for the *glabrous Rockcress*, is mentioned below under *Erysimum*, of which it has the pod and seeds.

1. Glabrous Rockcress. *Arabis perfoliata*, Lam. (Fig. 55.)

(*Turritis glabra*, Eng. Bot. t. 777. Brit. Fl. *Tower Mustard*.)



Fig. 55.

An erect annual or biennial, 2 feet or more high, perfectly glabrous except a few soft hairs at the very base, and usually glaucous. Radical leaves spreading but withering early, obovate-oblong, sinuate or pinnately lobed, with a few forked hairs. Stem-leaves oblong-lanceolate, entire, clasping the stem by pointed auricles. Flowers small, white or pale straw-colour. Pods very long and narrow, erect and crowded in a long narrow raceme.

On banks and roadsides and in open woods, generally distributed over Europe and Russian Asia, except the extreme north, in northern America, and in Australia. Irregularly scattered over England and southern Scotland, but not recorded from Ireland. *Fl. summer*. The genus *Turritis*, which formerly comprised many species of *Rockcress*; is still maintained by some botanists for this species and a few American ones, which have the two rows of seeds rather more distinct than in other *Rockcresses*.

2. Tower Rockcress. *Arabis turrita*, Linn. (Fig. 56.)

(Eng. Bot. t. 178. *Towercress*.)

A tall, stiff, erect biennial, approaching in size and appearance to the last species, but rough and somewhat hoary with very short forked or stellate hairs. Radical leaves spreading and stalked, stem-leaves oblong-lanceolate, sessile, and clasping the stem by their rounded auricles, all slightly toothed. Flowers small, of a dirty yellowish-white. Pods above 3 inches long, on short, erect pedicels, but all curved downwards to one side, forming a long, dense, nodding raceme. Seeds oblong, with a membranous border.



Fig. 56.

In hedges, on shady banks, and under rocks, in the hilly districts of central and southern Europe, and establishes itself readily on old walls further north, reappearing, truly indigenous, in the Australian Alps. Indicated at Oxford, at Cambridge, and in Kent, but evidently only introduced into Britain. *Fl. spring or early summer*.

3. Hairy Rockcress. *Arabis hirsuta*, Br. (Fig. 57.)

(*Turritis hirsuta*, Eng. Bot. t. 51.)

A rather stiff, erect annual or biennial, attaining a foot or rather more in height, but often shorter, usually simple, and rough with short hairs. Radical leaves spreading, obovate or oblong, and slightly toothed; stem-leaves generally erect, oblong or lanceolate, all, or at least the upper ones, clasping the stem by short auricles. Flowers small and white. Pods slender, 1 to 2 inches long, erect and crowded in a long raceme. Seeds without any wing.



Fig. 57.

On walls, banks, and rocks, common in the greater part of Europe and Russian Asia, but not in high northern latitudes. Not an abundant plant in Britain, although occurring in numerous localities even in the north of Scotland. *Fl. summer*.

4. Fringed Rockcress. *Arabis ciliata*, Br. (Fig. 58.)

(*Turritis alpina*, Eng. Bot. t. 1746.)



Fig. 58.

Very near the *hairy R.*, but not above 6 inches high; the stem usually glabrous, and the leaves only fringed with a few stiff hairs on their edge, the upper ones rounded at the base and not auricled. The flowers are rather larger, and the pods less erect.

In stony and rocky places, in the mountains of central Europe. In Britain, only by the seaside at Rinville, Cunnemara, in Ireland. *Fl. summer*. There is some doubt whether the Irish and the Continental plants are the same; but probably both are mere varieties of the common *hairy R.*

5. Thale Rockcress. *Arabis Thaliana*, Linn. (Fig. 59.)

(Eng. Bot. t. 901. *Sisymbrium*, Brit. Fl. *Thalecress*. *Wallcress*.)



Fig. 59.

A slender, erect, branching annual, usually about 6 inches high, but sometimes attaining a foot, clothed with short, spreading, stiff hairs, or sometimes nearly glabrous. Leaves mostly radical and spreading, oblong, with a few coarse teeth from $\frac{1}{2}$ to 1 inch long. Stem-leaves few, small, and sessile. Flowers small and white. Pods on spreading pedicels, in slender racemes, narrow linear, varying from 4 or 5 lines long to twice that length. Seeds small, the two rows blended into one; the cotyledons placed obliquely, so that the radicle is almost incumbent on the back of one of them.

On old walls, dry banks, and stony waste places throughout Europe and Russian Asia, extending into northern America. Frequent in Britain. *Fl. early spring, and occasionally also in summer and autumn*. On account of the position of the radicle, this species is referred by some to *Sisymbrium*, with which it has little else in common.

6. Bristol Rockcress. *Arabis stricta*, Huds. (Fig. 60.)

(Eng. Bot. t. 614.)

A perennial, but probably of few years' duration, resembling in some

respects the *northern R.* Radical leaves in a small spreading tuft, pinnately lobed, and hispid with stiff hairs. Stems about 6 inches high, erect, and nearly simple, with very few small leaves narrowed at the base. Petals narrow and erect. Pods erect, about an inch long.

The Continental distribution of this species is uncertain, as the name is often given to plants quite different from ours; but it appears to be a native of limestone rocks in the mountains of western Europe. In Britain, only on St. Vincent's Rocks, near Bristol, where it is getting very scarce, and it will probably soon have to be expunged from our Floras. *Fl. spring.*

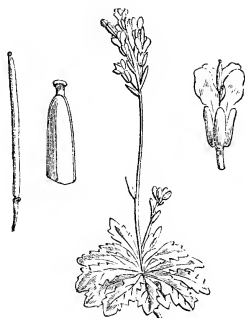


Fig. 60.

7. Northern Rockcress. *Arabis petræa*, Lam. (Fig. 61.)

(*Cardamine hastulata*. Eng. Bot. t. 469.)

A small perennial, in some respects intermediate between *Rockcress* and *Bittercress*. Stems branched at the base, loosely tufted, or shortly diffuse, or almost creeping, but seldom above 6 inches long. Radical and lower leaves obovate or oblong, and stalked, mostly pinnately divided, with the terminal lobe largest, or some of them nearly entire; the upper leaves few, narrow, almost entire, tapering at the base. Flowers few, considerably larger than in the *hairy R.*, white, or slightly purplish. Pods spreading, rather more than half an inch long, the seeds apparently in single rows.

In the mountains of northern Europe, and in the higher ranges of central Europe, extending all across Russian Asia. In Britain, frequent on the higher mountains of northern and western Scotland, and has been found also in Cumberland and North Wales. *Fl. summer.*



Fig. 61.

VI. BITTERCRESS. CARDAMINE.

Herbs, either annual or with a perennial rootstock, glabrous, or bear-

ing only a few simple hairs; the leaves pinnate, or, if undivided, on long stalks; the flowers white or pink. Stigma capitate, or small. Pod narrow-linear; the valves flat, without any conspicuous midrib, and usually opening with elasticity. Seeds apparently in a single row in each cell; radicle accumbent on the edge of the cotyledons.

A large and natural genus, widely spread over the temperate and colder regions of both the northern and southern hemispheres. The white flowers and pinnate leaves distinguish it from all British Crucifers, except the *common Watercress* and the *Toothcress*, both of which differ in their pods.

Petals large, obovate or oblong, spreading.

Stem weak. Segments of the stem-leaves broad.

Rootstocks slender, with creeping offsets. All

the leaves pinnate 1. *Bitter B.*

Rootstock thick and knotted. Upper leaves nearly

entire, often with a bulb in their axil . . . *Bulbiferous Toothcress.*

Stem stiff and erect. Segments of the stem-leaves

narrow 2. *Meadow B.*

Petals small, nearly erect.

Stem tall and erect. Leafstalk with stipule-like

appendages at the base 3. *Narrow-leaved B.*

Stem low and weak, or much branched. No sti-

pular appendages 4. *Hairy B.*

1. Large Bittercress. *Cardamine amara*, Linn. (Fig. 62.)

(Eng. Bot. t. 1000.)

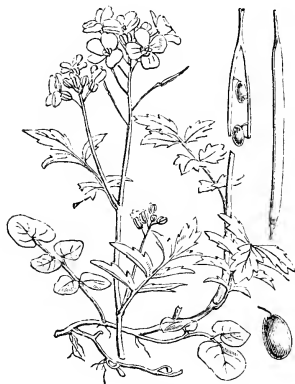


Fig. 62.

Rootstock slender, with creeping offsets. Stem a foot high or more, weak and ascending, or nearly erect. Leaves pinnate, with 5 or 7 distinct segments, all ovate or orbicular, irregularly angled or toothed, the terminal one often an inch long. Racemes few-flowered. Petals nearly as large as in the *meadow B.*, slightly spreading, of a pure white. Pod about an inch long.

In wet meadows, and along brooks and streams, generally distributed over Europe and Russian Asia, except the extreme north, becoming a mountain plant in the south. Widely spread over Britain, but not a common or frequent

plant. *Fl. spring and early summer.*

2. Meadow Bittercress. *Cardamine pratensis*, Linn.

(Fig. 63.)

(Eng. Bot. t. 776. *Bittercress*. *Ladies' Smock*. *Cuckooflower*.)

Rootstock short and perennial, often bearing small fleshy scales or tubers, like the *Toothcresses*. Stem erect, simple or branched, near a foot high. Leaves pinnate, the segments of the lower radical ones ovate or orbicular, the terminal one the largest, those of the stem-leaves narrow-oblong or linear. Flowers large and showy; the petals obovate and spreading, sometimes of a pure white, but more frequently tinged with a pinkish purple. Pods more than an inch long.

In moist meadows, and along brooks and streams, common throughout Europe, Russian Asia, and arctic America. Abundant in Britain. *Fl.* spring and early summer.



Fig. 63.

3. Narrow-leaved Bittercress. *Cardamine impatiens*, Linn.

(Fig. 64.)

(Eng. Bot. t. 80.)

An annual, with a stiff, erect, leafy stem, a foot and a half high, simple, or with a few erect branches. Leaves pinnate, with numerous lanceolate or almost ovate segments, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, and often deeply toothed or cut; the common leafstalk has, on each side, at its base, a curved linear appendage embracing the stem, and resembling a stipule. Petals very minute, and sometimes wanting. Pods numerous, about an inch long, the valves rolling back at maturity, with much elasticity.

On moist rocks, and in shady waste places, over a great part of Europe and Russian Asia. In Britain, scattered over central and northern England and southern Scotland, but not recorded from Ireland. *Fl.* summer.



Fig. 64.

4. **Hairy Bittercress.** *Cardamine hirsuta*, Linn. (Fig. 65.)
(Eng. Bot. t. 492.)



Fig. 65.

An annual, of a deep green colour, often much branched at the base, with ascending or erect stems, sometimes a foot high, but usually not half so much, with a few scattered hairs, which, however, are often very inconspicuous. Leaves pinnate, the segments small, those of the lower leaves ovate or rounded, and angularly toothed, the upper ones narrower and more entire. Flowers small and white, the petals seldom twice the length of the very small sepals. Pods in a rather loose raceme, about 6 lines to 1 inch long.

On moist or shady banks, waste and cultivated places, throughout the temperate regions of the globe. Abundant in Britain. *Fl. spring and all summer.* It varies much, like other *Bittercresses*, in the length and thickness of the style; and in the common small form the stamens are usually reduced to 4. A large luxuriant variety, with 6 stamens, is sometimes distinguished as a species, under the name of *C. sylvatica*.

VII. **TOOTHCRESS.** DENTARIA.

Perennials, with a horizontal, fleshy, and toothed or knotted root-stock, and simple stems, with a few rather large pinnate or stalked leaves, and bearing rather large white or purple flowers; the other characters those of *Bittercress*, except that the pod is rather broader and tapering at the top, and the little seedstalks are usually flat and broad.

A genus of several species, with a somewhat peculiar habit, all confined to the northern hemisphere.

1. **Bulbiferous Toothcress.** *Dentaria bulbifera*, Linn.
(Fig. 66.)

(Eng. Bot. t. 309. *Coralroot*.)

Stem weak, 1 to 1½ feet high, bearing several leaves, often with a

small ovoid bulb in their axil, the lower ones pinnate, with 5 or 7 segments, the upper ones with fewer segments, or quite undivided; all the segments lanceolate, entire or toothed, tapering at the base, mostly $1\frac{1}{2}$ to 2 inches long. Flowers few, rather large. The pod is seldom formed, as the plant usually propagates by the axillary bulbs falling to the ground, and there growing.

In damp woods, and shady places, chiefly in mountain districts, spread over Continental Europe from Scandinavia and central France to the Caucasus. In Britain, confined to some of the metropolitan counties of England. *Fl. spring.*



Fig. 66.

VIII. **HESPERIS.** HESPERIS.

Coarse, erect herbs, more or less hairy, with toothed leaves, and rather large, purple flowers, resembling those of the *Stocks*. Calyx erect. Petals on long claws. Pods long and linear, nearly cylindrical; the stigma oblong, erect, and very shortly divided into two parallel lobes. Seeds not winged, apparently in a single row in each cell; the radicle incumbent on the back of one of the cotyledons.

A small genus, confined to Europe and northern Asia, nearly allied to the *Stocks*, but with a somewhat different habit, and the radicle incumbent, not accumbent.

1. **Common Hesperis.** *Hesperis matronalis*, Linn. (Fig. 67.)

(*H. inodora*, Eng. Bot. t. 731. *Dame's Violet*.)

Stem 2 to 3 feet high, usually slightly branched. Leaves shortly stalked, or tapering at the base, ovate-lanceolate or lanceolate, 2 to 3 inches long, or the upper ones smaller. Flowers usually fragrant in the evening. Pods 2 to 4 inches long, nearly cylindrical, but much contracted between the seeds.

In hedges, bushy places, and open woods, in central and southern Europe, and all across Russian Asia, and, having been long cultivated



Fig. 67.

in cottage gardens, is frequently met with, apparently wild, further to the north. In Britain, probably only as an outcast from gardens. *Fl. early summer.*

The *Virginia Stock* of our gardens, a seacoast plant of southern Europe, is said to have been found on our own shores near Dover. It belongs to the genus *Malcolmia*, only differing from *Hesperis* in the more pointed lobes of the stigma, and the pod slightly thickened at the base.

IX. SISYMBRIUM. SISYMBRIUM.

Annual, or rarely perennial, erect herbs, glabrous, or with spreading hairs; the flowers small, yellow, or in some exotic species, white. Pod linear, nearly cylindrical, the lateral nerves of the valves more or less distinct; the stigma entire, small or capitate, closely sessile on the summit of the valves. Seeds apparently in a single row, ovoid or oblong, not flattened; the radicle incumbent on the back of one of the cotyledons.

A numerous genus, spread over the northern hemisphere, with the yellow flowers and habit of *Wintercress* and *Brassica*, but differing essentially from both in the position of the radicle. Several species of the three genera are popularly known by the name of *Rocket*.

Leaves deeply pinnatifid.

Terminal lobe of the leaves broad and very obtuse,
much larger than the others *Common Wintercress.*

Lobes of the leaves lanceolate, the lower ones often
curved backwards.

Pods short, downy, closely pressed against the axis 1. *Common S.*

Pods long, glabrous, spreading, and often turned
to one side 2. *Broad S.*

Leaves twice or thrice pinnate, with numerous small
linear segments 3. *Fine-leaved S.*

Besides the above, the *S. polyceratium*, from Continental Europe, is said to have established itself in the streets of Bury, in Suffolk. It has the foliage of the *broad S.*, with numerous shorter pods crowded in the axils of the upper leaves.

1. Common *Sisymbrium*. *Sisymbrium officinale*, Scop. (F. 68.)

(Eng. Bot. t. 735. *Hedge Mustard*.)

An erect annual, more or less downy, a foot high or rather more, with very rigid, spreading branches. Leaves deeply pinnatifid, with few lanceolate, slightly toothed lobes, the terminal one from 1 to $1\frac{1}{2}$ inches long, the others smaller, often curved backwards towards the stem; the upper leaves sometimes undivided and hastate. Flowers very small and yellow. Pods about 6 lines long, thick at the base, tapering to the point, more or less hairy, almost sessile, and closely pressed against the axis, in long, slender racemes, the midribs of the valves almost as prominent as in *Erysimum*.

In waste places, and by roadsides, common throughout Europe and Russian Asia, except the extreme north. Abundant in Britain, excepting the northern extremity of Scotland. *Fl. summer*.



Fig. 68.

2. Broad *Sisymbrium*. *Sisymbrium Irio*, Linn. (Fig. 69.)

(Eng. Bot. t. 1631. *London Rocket*.)

An erect annual, with a hard stem, a foot high or more, and glabrous or nearly so. Leaves deeply pinnatifid or pinnate, the lobes or segments lanceolate, more numerous and larger than in the *common* *S*. Flowers small and yellow. Pods on more or less spreading pedicels, $1\frac{1}{2}$ to 2 inches long, often all turned to one side, forming a dense, erect raceme.

In waste places, and by roadsides, in central and southern Europe to the Caucasus. Rare in Britain, and chiefly recorded from the neighbourhood of London, Berwick, Dublin, and some other towns. *Fl. summer*.



Fig. 69.

3. Fine-leaved *Sisymbrium*. *Sisymbrium Sophia*, Linn. (Fig. 70.)

(Eng. Bot. t. 963. *Flixweed*.)

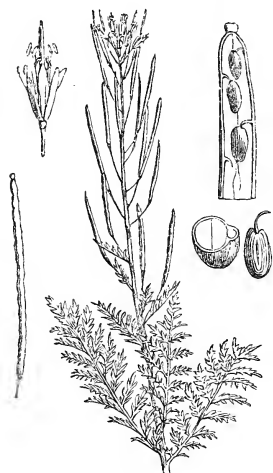


Fig. 70.

An erect annual, a foot high or rather more, not so coarse as the two last, and somewhat hoary with a very short down. Leaves two or three times divided into numerous short linear segments. Flowers small and yellow. Pods slender and glabrous, 9 to 12 lines long, on slender, spreading pedicels, forming loose, terminal, erect racemes.

In waste places, by roadsides, etc., in Europe and northern Asia, from the Arctic Circle to the Mediterranean, the Caucasus, and Himalaya, and in northern America; thinly scattered through Britain. *Fl. summer*.

X. **ALLIARIA.** ALLIARIA.

A single species, associated by some with *Sisymbrium*, by others with *Erysimum*; differing from the former by the valves of the pod with a prominent midrib, as in *Erysimum*; from the latter by white flowers, and a more cylindrical pod; from both by a peculiar habit of foliage, and by the striate seed of which the short stalk is more distinctly expanded (within the pod) into a broad, white membrane.

1. Common *Alliaria*. *Alliaria officinalis*, DC. (Fig. 71.) (*Erysimum Alliaria*, Eng. Bot. t. 796. *Garlic mustard*. *Sauce-alone*.)

An erect annual or biennial, or sometimes of longer duration, 1 to 3 feet high, emitting a strong smell of garlic when rubbed, glabrous, or with a few long hairs on the stem and the edges of the leaves. Lower leaves on long stalks, orbicular and crenate; those of the stem on shorter stalks, cordate-ovate, or triangular, coarsely toothed, 2 to 3 inches long and broad. Flower small and white. Pods on short, spreading

stalks, stiff and glabrous, 1 to $1\frac{1}{2}$ inches long, nearly cylindrical, but with a very prominent midrib on each valve.

Under hedges, in shady waste or cultivated places, over the greater part of Europe and western Asia, but not an Arctic plant. Frequent in Britain generally, but decreasing much in northern and western Scotland. *Fl. spring.*



Fig. 71.

XI. **EYSIMUM.** ERYSIMUM.

Erect annuals or perennials, pale or hoary with closely appressed hairs, rarely quite glabrous; the leaves entire, or slightly toothed. Flowers yellow, or rarely yellowish-white. Pod linear, nearly quadrangular from the very prominent midrib of the valves. Stigma broadly capitate, or with short, spreading lobes. Seeds ovoid or oblong, the seedstalk not flattened, the radicle incumbent on the back of one of the cotyledons.

A rather numerous genus in the northern hemisphere, differing from *Wallflower* in the seeds, from *Sisymbrium* by the midrib of the valves of the pod more prominent than in all the species of that genus except the common *S.*

- | | |
|--|----------------------|
| Plant slightly hoary. Leaves tapering at the base | 1. <i>Common E.</i> |
| Plant glabrous and glaucous. Leaves clasping the stem, and rounded at the base | 2. <i>Eastern E.</i> |

1. **Common Erysimum.** *Erysimum cheiranthoides*, Linn. (Fig. 72.)

(Eng. Bot. t. 942. *Treacle Mustard.*)

A stiff, erect annual, 1 to 2 feet high, slightly hoary with closely appressed hairs. Leaves numerous, of a pale green, broadly lanceolate, entire or slightly toothed, tapering into a short stalk at the base.



Fig. 72.

Flowers small, pale yellow. Pods numerous, on spreading pedicels, seldom an inch long, the stigma slightly dilated.

In waste and cultivated places, in northern and central Europe, Russian Asia, and northern America, becoming rather a mountain plant in southern Europe. Diffused over a great part of Britain, but probably in many cases introduced. *Fl. summer and autumn.*

2. Eastern Erysimum. *Erysimum orientale*, Br. (Fig. 73.)

(*Brassica*, Eng. Bot. t. 1804. *Hare's-ear*.)



Fig. 73.

An erect, perfectly glabrous, and somewhat glaucous annual, a foot high or rather more. Radical leaves obovate and stalked, the stem-leaves oblong, 2 or 3 inches long, quite entire, and embracing the stem with prominent rounded auricles. Flowers pale yellow, or whitish. Pods 3 or 4 inches long, slender, in a loose raceme, the midrib of the valves very prominent.

In stony fields and waste places, in central and southern Europe, and western Asia, extending northwards to the Baltic. In Britain it has been gathered occasionally, near the southern and eastern coasts of England, but appears scarcely to be permanently established. *Fl. spring and summer.*

XII. **BRASSICA.** BRASSICA.

Annuals or perennials, either glabrous or with stiff or rough hairs, the lower leaves usually deeply pinnate, or lyrate, the upper ones sometimes entire, the flowers yellow. Pod linear, cylindrical or nearly so, more or less *beaked* at the top beyond the end of the valves, the beak consisting either of the conical style alone, or including a portion of the pod itself, with one or more seeds in it. Seeds globular, ovoid, or somewhat flattened, the cotyledons folded longitudinally over the radicle.

A numerous genus, spread over Europe and northern and central Asia, comprising the *Brassica* and *Sinapis* of Linnæus, and divided by other botanists into from three to six or even more genera, variously defined, according to the peculiar views entertained by each, but all aptly united into one by Boissier. It is distinguished from *Sisymbrium* and *Wintercress* essentially by the folded cotyledons, and in most cases by the beak of the pod. Even in the two first species, and in the *black B.*, where the beak is not so distinct, the persistent style is more conical at the base than in the *Wintercress*, and very much longer than in the *Sisymbrium*.

Upper stem-leaves entire, sessile or clasping the stem.

All the leaves glabrous and glaucous, the upper ones not auricled 4. *Cabbage B.*

Radical leaves more or less hispid, the upper ones auricled at the base 5. *Field B.*

All the leaves pinnately cut or stalked.

Six or fewer seeds in each cell of the pod.

Pods slender and short, closely pressed against the axis of the raceme. Beak small.

Pods ending in a slender style, slightly conical at the base 8. *Black B.*

Pods ending in a distinct beak, thickened at the base 9. *Hoary B.*

Pods more or less spreading in a loose raceme. Beak large.

Pod very hispid, rather shorter than the long flat beak 6. *Mustard B.*

Pod glabrous, or rough, rather longer than the conical beak 7. *Charlock B.*

Ten, twelve, or more seeds in each cell of the pod.

Pod $1\frac{1}{2}$ to 2 inches, the beak distinct, with 1 or 2 seeds 3. *Isle of Man B.*

Pod slender, not $1\frac{1}{2}$ inch long. The beak very short, without seeds.

Branched and leafy perennial, a foot high or more 1. *Wall B.*

Low annual, the leaves mostly radical 2. *Sand B.*

1. **Wall Brassica.** *Brassica tenuifolia*, Boiss. (Fig. 74.)

(*Sisymbrium*, Eng. Bot. t. 525. *Diplotaxis*, Brit. Fl. *Rocket*.)

A loosely branched or bushy perennial, 1 to 2 feet high, perfectly



Fig. 74.

glabrous and somewhat glaucous, emitting a disagreeable smell when rubbed. Leaves very variable, mostly irregularly pinnate, 2 to 4 or 5 inches long, with a few lanceolate or oblong, entire or coarsely toothed segments, the upper leaves often entire or nearly so. Flowers rather large, lemon-coloured. Pods in a loose raceme, about $1\frac{1}{2}$ inches long, slender, spreading, with numerous small seeds distinctly arranged in two rows.

On old walls, ruins, and waste places, in central and southern Europe to the Caucasus, extending northwards to southern Sweden. In Britain, chiefly in southern England and near the sea. *Fl. the whole summer.*

2. Sand Brassica. *Brassica muralis*, Boiss. (Fig. 75.)

(*Sisymbrium*, Eng. Bot. t. 1090. *Diploaxis*, Brit. Fl.)



Fig. 75.

An annual, branching from the base, usually about 6 inches high, with the same smell as the last. Leaves mostly radical, or crowded at the base of the stems, less deeply divided than in the *wall B.*, and often only sinuate. Flowers much smaller, the pods and seeds similar, but also smaller.

In fields, cultivated and waste places, very common in southern, and scattered over central Europe. In Britain, abundant in some of the southern counties of England and Ireland, and appearing occasionally further north, especially near the sea. *Fl. all summer.*

3. Isle of Man Brassica. *Brassica monensis*, Huds.

(Fig. 76.)

(*Sisymbrium*, Eng. Bot. t. 962.)

Either an annual or forming a stock of two or three years' duration, glabrous, or bearing a few stiff hairs at its base. Stems sometimes barely 6 inches high, with the leaves mostly radical, sometimes loosely branched above a foot high, and more leafy. Radical leaves pinnatifid or pinnate, the lobes or segments short and broad, and marked by a few coarse teeth, the upper leaves more deeply divided, with narrower segments. Flowers rather large, pale yellow. Pods spreading, $1\frac{1}{2}$ to above 2 inches long, terminating in a thick beak, varying in length from a fifth to above a third of the whole pod, and usually containing 1 to 3 seeds above the valves.



Fig. 76.

In western Europe, and chiefly in the Pyrenees and south-western Alps, but extending up the west coast of France to Britain. *Fl. summer*. The smaller and more stunted state is the most frequent in sandy places on the western coasts of Great Britain as far north as Bute, but the more luxuriant variety, often distinguished as a species, under the name of *Sinapis* or *Brassica Cheiranthus* (Eng. Bot. Suppl. t. 2821), has also been found in South Wales and the Channel Islands.

4. Cabbage Brassica. *Brassica oleracea*, Linn.

(Fig. 77.)

(Eng. Bot. t. 637.)

In the wild state the *Cabbage* has a thick, almost woody stock, probably of two or three years' duration, branching into erect stems 1 to 2 feet high. Leaves glabrous and glaucous, the lower ones large, stalked, broad, sinuate, or lobed at the base, the upper ones oblong, usually sinuate, clasping the stem by their broad base, but not projecting into auricles. Flowers rather large, pale yellow. Pod spreading, $1\frac{1}{2}$ inches or more in length.

On maritime cliffs, indigenous round the Mediterranean, and re-



Fig. 77.

appearing in several places on the coasts of northern France and of England and Ireland, but probably in many northern localities, originally escaped from cultivation. *Fl. early summer*. The cultivated forms of this species include the *Cabbage*, *Cauliflower*, *Broccoli*, *Kale*, *Kohlrabbi*, etc., of gardeners.

5. Field Brassica. *Brassica campestris*, Linn. (Fig. 78.)

(Eng. Bot. t. 2146, 2176, and 2234.)



Fig. 78.

In its wild state this is an erect, simple, or scarcely branched annual, 1 to 2 feet high. Lower leaves green and slightly glaucous, more or less pinnately divided, with a large terminal lobe, and rough with stiff hairs, which are sometimes very copious, and rarely entirely wanting; upper leaves narrow-oblong or lanceolate, clasping the stem with rounded projecting auricles. Flowers and pods much like those of the *Cabbage*, but the petals are usually of a brighter yellow.

On borders of fields, and waste places, throughout Europe and Russian Asia. A frequent weed of cultivation in Britain. *Fl. spring and summer*. The cultivated varieties include the *Turnip* (*B. Napus*), the *Rapeseed* or *Colza* (*B. Rapa*), and probably also the *Swedish Turnip*.

6. Mustard Brassica. *Brassica alba*, Boiss. (Fig. 79.)*(Sinapis, Eng. Bot. t. 1677. Cultivated Mustard.)*

Stem 1 to 2 feet high, glabrous, or with spreading, stiff hairs. Leaves pinnately lobed or divided, more or less rough, the lobes ovate or oblong, coarsely toothed, the terminal one the largest. Flowers rather large, fruit-pedicels spreading. Pod $\frac{3}{4}$ to 1 inch long, but more than half occupied by a stout flattened beak, often curved, with a single seed in its base, the valves and lower part of the beak very hispid with stiff white hairs concealing the prominent nerves.

In waste and cultivated places, in temperate and southern Europe and western Asia, and often cultivated for salad or forage. Not unfrequent in some parts of England and Ireland, more rare in Scotland. *Fl. all summer.*



Fig. 79.

7. Charlock Brassica. *Brassica Sinapistrum*, Boiss.*(Fig. 80.)**(Sinapis arvensis, Eng. Bot. t. 1748. Charlock. Wild Mustard.)*

A coarse annual, 1 to 2 feet high, with a few stiff spreading hairs. Leaves rough with very short hairs, the lower ones usually with one large oval or oblong coarsely-toothed segment, and a few smaller ones along the leafstalk, the upper ones often undivided, oblong or lanceolate. Flowers rather large. Pods more or less spreading, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, of which rather more than a third is occupied by a stout beak, often containing a seed in its base; the valves glabrous, or rough with stiff reflexed hairs, the lateral nerves prominent.

A native probably of southern Europe, but now one of the most abundant weeds of cultivation throughout Europe and Russian Asia, and but too common all over Britain. *Fl. all summer.*

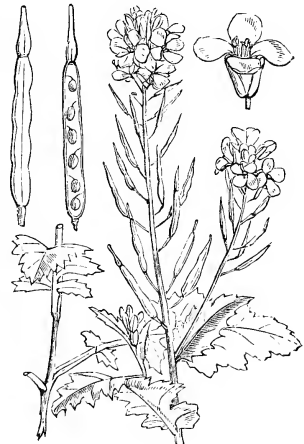


Fig. 80.

8. Black Brassica. *Brassica nigra*, Boiss. (Fig. 81.)

(*Sinapis*, Eng. Bot. t. 969. *Black Mustard*.)



Fig. 81.

Less hairy than the two last species, and sometimes entirely glabrous, especially in the upper part, but the lower leaves and stem are generally slightly hispid. Stem 2 feet high or more. Leaves mostly deeply divided, with one large terminal ovate or oblong lobe and a few small lateral ones, the upper leaves often small and entire. Flowers rather smaller than in the *Charlock*. Pods on short pedicels, closely pressed against the axis of the long slender racemes, glabrous, seldom more than half an inch long, with a slender style, slightly conical at the base, the valves marked with a strong midrib.

On banks, under hedges, in waste and cultivated places, in central and southern Europe and central Asia, and much cultivated for its seed. Scattered over England, and abundant on some points of the south coast, more rare in Scotland, and probably introduced only into Britain from or with cultivation. *Fl.* summer.

9. Hoary Brassica. *Brassica adpressa*, Boiss. (Fig. 82.)

(*Erucastrum incanum*, Eng. Bot. Suppl. t. 2848. *Sinapis*, Brit. Fl.)



Fig. 82.

Very like the *black B.* in habit and foliage, but more frequently biennial, the stem stiffer and harder at the base, the leaves less divided, and more or less hoary with short rough hairs. Pods short and closely pressed against the axis, as in the *black B.*, but they terminate in a short thick beak, with a seed in the base, instead of a slender style. Seeds rather ovoid, not globular.

On sandy or arid places near the sea, in southern Europe, extending up the west coast of the Channel Islands. *Fl.* summer.

XIII. **COCHLEARIA.** COCHLEARIA.

Annuals or perennials, usually glabrous, with undivided leaves, and white flowers. Filaments of the stamens without appendages. Pod globular, ovoid or shortly oblong, with a broad partition; the valves very convex. Seeds several in each cell, not bordered, the radicle accumbent on the edge of the cotyledons.

Besides the common northern species, the genus contains several Asiatic and south European ones, some of them intermediate, in appearance, between the two rather dissimilar ones here associated. The pod is very different from that of any other British white-flowered Crucifer.

Tall erect plant, with very large oblong radical leaves . . . 1. *Horseradish C.*
 Low diffuse plant, the leaves small and thick 2. *Scurvy C.*

1. **Horseradish Cochlearia.** *Cochlearia Armoracia*, Linn.
 (Fig. 83.)

(Eng. Bot. t. 2323. *Armoracia rusticana*, Brit. Fl. *Horseradish*.)

Rootstock tapering into a long root. Radical leaves on long stalks, often 6 inches to a foot long, and 4 to 6 inches broad, sinuate and toothed at the edges, glabrous, but rough. Stems 2 to 3 feet high, erect; the leaves smaller and narrower than the radical ones, the lower ones often deeply toothed or almost pinnatifid. Flowers small and white, in numerous racemes, forming a terminal panicle. Pods on slender pedicels, ovoid or elliptical, without any prominent nerve.

A plant of south-eastern origin, introduced by cultivation only into northern and western Europe. It has become perfectly naturalized in several parts of Britain, especially near the sea. *Fl. summer*. The pod seldom comes to perfection in this country.

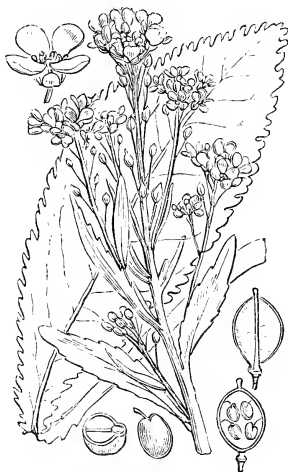


Fig. 83.

2. **Scurvy Cochlearia.** *Cochlearia officinalis*, Linn. (Fig. 84.)

(Eng. Bot. t. 551, and *C. grænlundica*, t. 2403. *Scurvy-grass*.)

A low, diffuse, quite glabrous, and somewhat fleshy annual or biennial, the stems seldom above 6 inches long. Lower leaves stalked, orbicular



Fig. 84.

or reniform, entire or angularly toothed; the upper ones sometimes similar, sometimes ovate or oblong, and often quite sessile. Flowers in short racemes, the petals obovate and spreading. Pods globular or ovoid, varying from 2 to 3 lines in diameter, pointed by the short style, the midrib of the valves very prominent when dry.

In stony, muddy, or sandy soils, all around the Arctic Circle, on the sea-coasts of northern and western Europe, and at considerable elevations in the great mountain chains of Europe. Not uncommon on the shores of England and Ireland, still more abundant on those of Scotland, penetrating inland along some of its rivers, and in the Highland moun-

tains. *Fl. all summer.* It varies much in the size and shape of the leaves, in the size of the flowers, and the size and shape of the pods, and has been divided into two, three, or even eight or nine species. The most prominent varieties are the *C. danica* (Eng. Bot. t. 696), with all the leaves stalked, and the *C. anglica* (Eng. Bot. t. 552), with large flowers and pods.

XIV. **ALYSSUM.** ALYSSUM.

Annuals or low branching perennials, with a hoary or short stellate down, and white or yellow flowers. Filaments of the stamens, or the shorter ones only, usually winged near the base, or thickened, or furnished with small teeth. Pod sessile within the calyx, orbicular or oval, the partition broad, the valves convex and not veined. Seeds 1 to 4, or very rarely more, in each cell. Radicle accumbent on the edge of the cotyledons.

An extensive genus, ranging over Europe and northern Asia, and tolerably natural, distinguished from *Draba* chiefly by the short few-seeded pod, with more convex valves, or by the appendages to the base of the filaments, one or other of these characters being observable in all the species. They have also usually a stiffer, more leafy habit, and even the annuals often look woody.

Sepals persisting round the pod. Petals minute, yellowish-white.

Seeds 2 in each cell 1. *Small A.*

Sepals falling off after flowering. Petals spreading, pure white.

Seeds 1 in each cell 2. *Sweet A.*

The *A. incanum*, often separated as a genus under the name of *Berteroa*, having longer pods with more seeds, a common annual in central and eastern Europe, is said to have been occasionally found near Lewes and near Weymouth, but does not appear to be permanently established. The yellow-flowered *A. saxatile*, from southern Europe, is among the perennials long established in our rock-gardens.

1. Small Alyssum. *Alyssum calycinum*, Linn. (Fig. 85.)

(Eng. Bot. Suppl. t. 2853.)

A small, hard annual, often simple, 3 or 4 inches high, or, when very luxuriant, branching at the base, and 6 inches high. Leaves oblong-linear, much narrowed at the base. Petals inconspicuous, of a pale yellow. Pods in a long raceme, on short pedicels, nearly orbicular, the narrow herbaceous sepals persisting round them till they are ripe. The filaments of the shorter stamens have each a small fine tooth or appendage at their base.

In waste places, dry pastures, on the edges of fields, etc., in central and southern Europe, from Sweden to the Caucasus. In Britain, recently found in a few localities in England, Ireland, and southern Scotland. *Fl. spring and early summer.*

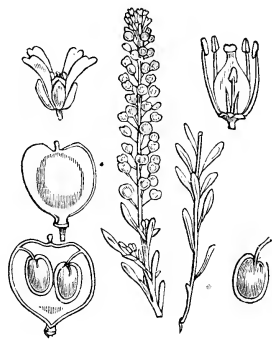


Fig. 85.

2. Sweet Alyssum. *Alyssum maritimum*, Linn. (Fig. 86.)

(Eng. Bot. t. 1729. *Koniga*, Brit. Fl.)

A hard annual or perennial, with much-branched procumbent or ascending stems, from 4 or 5 inches to near a foot long. Leaves narrow-lanceolate or linear, narrow at the base, or stalked. Flowers white, with a honey scent, rather small, but the petals obovate, spreading, and conspicuous. Pods orbicular or slightly oval, with only one seed in each cell; the calyx deciduous. The filaments are without appendages.

In waste places and dry pastures, chiefly near the sea; very abundant round the Mediterranean. Much cultivated in our flower-gar-

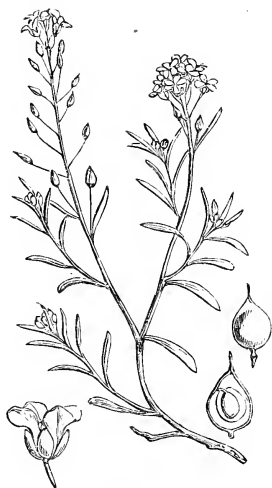


Fig. 86.

dens, and sowing itself readily, it has become more or less established as a weed of cultivation in some parts of England. *Fl. all summer*. Often distinguished as a genus, under the name of *Koniga*.

XV. **DRABA.** DRABA.

Small annuals or perennials, usually hairy or hoary with spreading or tufted radical leaves, entire or toothed, the stem-leaves few or none. Flowers white or yellow. Filaments of the stamens without appendages. Pod oblong or elliptical, from one and a half to near three times as long as broad, more or less flattened; the partition broad; the valves flat or convex, their midrib usually distinct. Seeds several in each cell. Radicle accumbent on the edge of the cotyledons.

A considerable genus, ranging over the northern hemisphere, ascending to the greatest elevations and to high Arctic latitudes, and extending along the great mountain chain of America into the southern hemisphere. The species mostly differ from *Alyssum* in their longer pod, and in a peculiar habit approaching that of the *Rockcresses*; from the latter genus they are distinguished by the pod, which, though long for a siliculose Crucifer, is still much shorter, in proportion to its width, than in the shortest *Rockcress*.

Flowers yellow (stiff tufted perennial) 1. *Yellow D.*
Flowers white.

Biennials or perennials. Pedicels short and stiff.

Stem with a few leaves, the radical ones spreading . . . 3. *Hoary D.*

Stem almost leafless, the radical leaves tufted . . . 2. *Rock D.*

Annuals. Pedicels slender, spreading.

Stem dwarf, erect, leafless. Petals deeply divided . . . 5. *Common D.*

Stem weak, ascending, leafy. Petals entire 4. *Wall D.*

1. Yellow Draba. *Draba aizoides*, Linn. (Fig. 87.)

(Eng. Bot. t. 1271.)

Stock perennial and branched, covered with closely-packed leaves, forming dense tufts of 2 or 3 inches in diameter. The leaves 3 or 4 lines long, sessile, linear, of a bright green, edged with stiff white hairs. Peduncles leafless, 1 to 4 or even 5 inches high, bearing a few rather large yellow flowers. Pods about 4 lines long, glabrous or slightly hairy, with a rather long style; the valves more convex than in the rest of the genus.



Fig. 87.

In clefts of rocks, and stony places, in the mountain districts of central and southern Europe. Long cultivated in our rock-gardens, it has established itself in considerable abundance on rocks and old walls about Pennard Castle, near Swansea. *Fl. spring.*

2. Rock Draba. *Draba hirta*, Linn. (Fig. 88.)

(Eng. Bot. t. 1338. *D. rupestris*, Brit. Fl.)

Stock shortly tufted and perennial, but not of long duration. Leaves crowded, 3 to 5 or 6 lines long, narrow-oblong or lanceolate, entire or slightly toothed, with a few stiff, simple or stellate hairs. Peduncles usually 1 or 2 inches, and leafless; in luxuriant specimens twice as long, with one or two small ovate leaves. Flowers few and small, but larger than in the *hoary D.* Pods 2 to 3 lines long, on short stiff pedicels, usually slightly hoary with a few very minute hairs.



Fig. 88.

In the mountains of the northern or Arctic regions of Europe, Asia, and North America. Rare on some of the higher mountain summits of Scotland. *Fl. July.* The specimens with slightly hoary pods (as are the Scotch ones) are by some distinguished, under the name of *D. rupestris*, from the original *D. hirta* of Linnæus (not found in Britain), in which they are almost or quite glabrous.

3. Hoary Draba. *Draba incana*, Linn. (Fig. 89.)

(Eng. Bot. t. 388, a luxuriant garden specimen.)

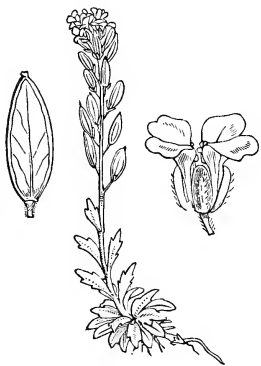


Fig. 89.

Nearly allied to the *rock D.*, but very different in appearance. Often only a biennial, with the radical leaves spreading, and seldom forming branched tufts; the whole plant hoary with short, single and stellate hairs. Stems erect, 6 inches high or more, with several small, sessile, oblong or lanceolate leaves. Flowers small, and white. Pods 3 to 5 lines long, on short, stiff pedicels, glabrous, or sprinkled with a few stellate hairs; the valves flat, or the whole pod slightly twisted.

In rocky situations, in northern and Arctic Europe and Asia, far more common than the *rock D.*, and descending to lower elevations. Not unfrequent in the Scotch Highlands, and extending into northern England, north Wales, and northern Ireland. *Fl. summer.*

4. Wall Draba. *Draba muralis*, Linn. (Fig. 90.)

(Eng. Bot. t. 912.)

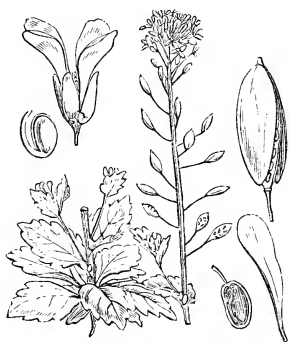


Fig. 90.

A slender, erect, but weak annual, from a few inches to a foot high, simple or slightly branched, green, but rough with short hairs. Radical leaves spreading, ovate or oblong, toothed, $\frac{1}{2}$ to 1 inch long. Stem-leaves smaller, ovate, clasping the stem by their cordate or auricled base. Petals white, entire, and very minute. Pods about 2 lines long, on spreading pedicels, in a long slender raceme, each containing about 6 seeds.

On rocks and walls, in limestone hilly districts, in the greater part of Europe and Russian Asia, from the Mediterranean to Scandinavia, and said to extend to the Arctic Circle. In Britain, sparingly scattered over several parts of England and southern Scotland. *Fl. spring.*

5. Common Draba. *Draba verna*, Linn. (Fig. 91.)

(Eng. Bot. t. 586. *Whitlow-grass*.)

A dwarf annual, lasting but a few weeks, the leaves all radical, ovate or oblong, seldom above half an inch long, and closely spreading on the ground. Peduncles slender, erect and leafless, 1 to 3 or rarely 4 inches high. Petals small, white, and deeply cleft. Pods on rather long slender pedicels, about 3 lines long, containing numerous minute seeds, on stalks of very unequal length.

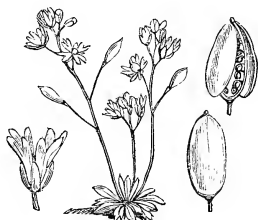


Fig. 91.

On walls, rocks, dry banks, and stony places, throughout Europe and western Asia, except the extreme north. Abundant in Britain. *Fl. early spring*. Distinguished by some as a genus, under the name of *Erophila*. A variety with remarkably inflate capsules occurs on Ben Lawers.

XVI. **CAMELINA.** CAMELINA.

Erect and more or less hispid annuals, with sagittate or auricled stem-leaves, and small yellow flowers. Pod obovoid, the partition broad, the valves very convex, with the midrib distinct, the edges flattened, forming a narrow margin round the pod. Style slender. Seeds several. The radicle incumbent on the back of the cotyledons.

A genus consisting of two or three European and north Asiatic species, perhaps all reducible to a single one, separated from *Cochlearia* on account of their yellow flowers and incumbent cotyledons.

1. Common Cameline. *Camelina sativa*, Crantz. (Fig. 92.)

(*Alyssum*, Eng. Bot. t. 1254. *C. fetida*, Bab. Man. *Gold of Pleasure*.)

Stem simple, or slightly branched, 1 to 2 feet high. Lowest leaves stalked, upper ones sessile, clasping the stem with pointed auricles, lanceolate, entire or toothed, 1 to 2 inches long. Pods about 3 lines long, on pedicels about twice that length, in a long, loose raceme.

In cultivated and waste places, in central and southern Europe, and



Fig. 92.

the temperate parts of Russian Asia; further north only as a weed of cultivation. In Britain, appearing occasionally in corn and flax fields in England and Ireland. *Fl. with the corn.*

XVII. **AWLWORT.** SUBULARIA.

A dwarf aquatic annual, with the pod of a *Draba*, but the valves more convex, and the radicle incumbent on the back of the cotyledons, which are linear, and the bend is, as in *Senebiera*, above the base of the cotyledons, not at their junction with the radicle, as in the rest of Crucifers.

The genus is limited to a single species.

1. **Water Awlwort.** *Subularia aquatica*, Linn. (Fig. 93.)

(Eng. Bot. t. 732.)



Fig. 93.

The whole plant is but 1 to 2, rarely 3, inches high, and perfectly glabrous, usually growing entirely under water. Leaves all radical, nearly cylindrical, slender and pointed, $\frac{1}{2}$ to 1 inch long. Flowers few, with minute white petals. Pods about a line and a half long, and oblong, or sometimes shorter, and nearly globular, with 5 or 6 seeds in each cell:

In the shallow edges of alpine ponds and lakes, in northern Europe, Asia, and America, and more rarely in central Europe. Scarce in Britain, in the mountains of Scotland, north-western England, and north Wales. *Fl. summer.*

XVIII. **PENNYCRESS.** THLASPI.

Annuals or low perennials, the leaves usually undivided, the upper ones clasping the stem, the flowers small and white. Petals equal, or nearly so. Pod orbicular or obovate, flattened laterally at right angles to the narrow partition, the valves boat-shaped, their midrib or *keel* more or less expanded into a green wing surrounding the pod. Seeds two or more in each cell. Radicle accumbent on the edge of the cotyledons.

A small genus, spread over Europe, northern and central Asia, and north-western America, distinguished from *Candytuft* and *Cress* by having more than one seed in each cell of the pod, from all others by the winged pod.

Pod (including the broad wing) orbicular, about 6 lines broad 1. *Field P.*

Pod obovate or obcordate, not 3 lines broad.

Annual. Pod nearly as broad as long, with about 4 seeds in each cell 2. *Perfoliate P.*

Biennial or perennial. Pod longer than broad, with 6 or

8 seeds in each cell 3. *Alpine P.*

1. **Field Pennycress.** *Thlaspi arvense*, Linn. (Fig. 94.)

(Eng. Bot. t. 1659. *Pennycress.* *Mithridate Mustard.*)

An erect, glabrous annual, 6 inches to a foot high or rather more, simple or branched in the upper part. Radical leaves stalked, but soon disappearing. Stem-leaves oblong or lanceolate, usually marked with a few coarse teeth; the lower ones narrowed at the base, the upper clasping the stem with prominent auricles. Pods in a long raceme, about half an inch in diameter, including a very broad wing, deeply notched at the top, with a very minute style in the notch. Seeds usually 6 in each cell.

In cultivated and waste places, throughout Europe and Russian Asia. Widely scattered over various parts of Britain, but not so common with us as on the Continent. *Fl. spring and summer.*

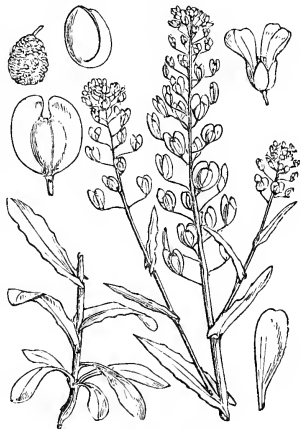


Fig. 94.

2. Perfoliate Pennycress. *Thlaspi perfoliatum*, Linn.

(Fig. 95.)

(Eng. Bot. t. 2354.)

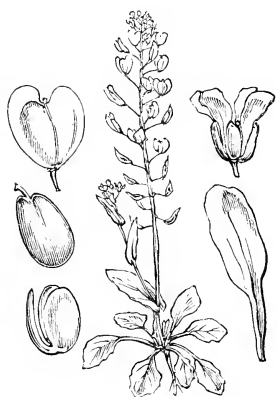


Fig. 95.

A glabrous annual, branching at the base, or nearly simple, the stem ascending or erect, 3 to 6 inches high. Radical leaves spreading or tufted, stalked, ovate or orbicular; upper stem-leaves ovate or oblong, clasping the stem with rather large, rounded auricles. Pods not half the size of those of the *field P.*, with narrower wings, and the notch at the top much broader and more open. Style nearly as long, or longer than the notch. Seeds usually 4 in each cell.

In stony pastures and waste places, chiefly in limestone districts, in central and southern Europe, and temperate Russian Asia. In Britain, apparently confined to a few localities in Oxfordshire and Gloucestershire. *Fl. spring.*

3. Alpine Pennycress. *Thlaspi alpestre*, Linn. (Fig. 96.)

(Eng. Bot. t. 81.)



Fig. 96.

A glabrous biennial or perennial, forming a shortly-branched or tufted stock, with obovate, oval, or oblong, stalked, radical leaves. Stems simple, erect or ascending, about 6 inches high; the leaves narrow, clasping the stem with small auricles. Flowers usually larger than in the two last. Pod about 3 lines long, but not so broad as in the *perfoliate P.*, especially at the base, the wings rounded at the top, leaving a broad but not a deep notch between them. Style prominent. Seeds 6 or 8 in each cell.

In mountain pastures, in limestone districts, in central and southern Europe, extending northward to southern Sweden, and eastward to the Russian frontier. In Britain, chiefly in the north of

England, but found also in some other parts, as well as in Wales and Scotland. *Fl. summer*. A slight variety, with rather larger flowers, has been distinguished as a species, under the name of *T. virens*.

XIX. **TEESDALIA.** TEESDALIA.

Dwarf annuals, with white flowers, two petals larger than the two others, as in *Candytuft*; but the longer filaments have a scale-like appendage near their base, and the pod has 2 seeds in each cell.

A genus confined to two European species.

1. **Common Teesdalia.** *Teesdalia nudicaulis*, Br. (Fig. 97.)

(*Iberis*, Eng. Bot. t. 327.)

Leaves radical and spreading, about half an inch long or but little more, usually pinnate, the terminal lobe larger, obovate or orbicular, glabrous, or with a few stiff hairs. Flower-stems 2 or 3 inches high, erect and leafless, or the lateral ones rather longer, ascending, with one or two small entire or pinnate leaves. Flowers very small. Pods in short racemes, nearly orbicular, about $1\frac{1}{2}$ line in diameter, flat, with a narrow wing round the edge, and a small notch at the top.



Fig. 97.

On sandy and gravelly banks and waste places, in central and southern Europe and western Asia. Rather generally distributed over England and southern Scotland, though not a very common plant, and not in Ireland. *Fl. at any time from spring to autumn*.

XX. **CANDYTUFT.** IBERIS.

Glabrous or minutely downy annuals or branching perennials, with narrow or pinnatifid leaves, and white or pink flowers; two adjoining exterior petals larger than the two others. Filaments without appendages. Pod orbicular or oval, laterally flattened (at right angles to the narrow partition), notched at the top, the valves boat-shaped, the keel or midrib expanded into a wing. One seed only in each cell, the radicle accumbent on the edge of the cotyledons.

A genus of several south European and western Asiatic species, some of which are cultivated in our flower-gardens under the name of *Candytufts*, and all readily known by the unequal petals.

1. **Bitter Candytuft.** *Iberis amara*, Linn. (Fig. 98.)

(Eng. Bot. t. 52, *the inflorescence too much elongated.*)

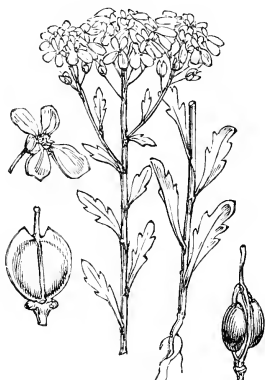


Fig. 98.

An erect, rather stiff annual, 6 inches to near a foot high, with a few erect branches forming a terminal flat corymb. Leaves oblong-lanceolate or broadly linear, with a few coarse teeth, or slightly pinnatifid, seldom quite entire. Flowers white. Pod nearly orbicular, the long style projecting from the notch at the top.

Common as a weed of cultivation in western, central, and southern Europe. Appears occasionally in cornfields in England, especially in limestone districts. *Fl. with the corn.*

XXI. **HUTCHINSIA.** HUTCHINSIA.

Dwarf annuals or perennials, with pinnate leaves and white flowers, separated from *Cress* as having two seeds in each cell of the pod instead of one.

A genus limited by some to one species, by others extended to a few allied ones from southern Europe and Russian Asia, or also to two or three perennials from the high mountain-ranges of central and southern Europe.

1. **Rock Hutchinsia.** *Hutchinsia petraea*, Br. (Fig. 99.)

(*Lepidium*, Eng. Bot. t. 111.)

A glabrous, delicate, erect annual, seldom 3 inches high, branching at the base. Radical leaves about half an inch long and pinnate; stem-leaves few and smaller, with fewer and narrower segments. Flowers very minute. Pod oval, rather more than a line long. Radicle of the seeds incumbent on the back of the cotyledons, but very near the edge.

On limestone rocks, old walls, and stony places, in central and southern Europe, from Sweden to the Crimea. Confined, in Britain, to the limestone tracts of the west and north of England and Wales, and of southern Ireland. *Fl. spring.*



Fig. 99.

XXII. **CAPSEL.** CAPSELLA.

Annuals, with entire or pinnate leaves and small white flowers, distinguished from *Cress* and *Hutchinsia* by having several seeds in each cell of the pod, from *Pennycress* by the pod not winged, and the radicle incumbent on the back of the cotyledons.

A genus of a single one, or of two or three, European and Asiatic species, according to the limits assigned to it by different botanists.

1. **Shepherd's-purse Capsel.** *Capsella Bursa-pastoris*, DC. (Fig. 100.)

(*Thlaspi*, Eng. Bot. t. 1485. *Shepherd's-purse*.)

Root tapering, often to a great depth. Radical leaves spread on the ground, pinnatifid, with a larger ovate or triangular terminal lobe, or sometimes entire. Stem erect, from a few inches to above a foot high, rather rough and often hairy, with a few oblong or lanceolate, entire or toothed leaves, clasping the stem with projecting auricles. Pods in a long loose raceme, usually triangular, truncate at the top, with the angles slightly rounded, and narrowed at the base, sometimes notched at the top and almost obcordate. Seeds 10 or 12 in each cell.



Fig. 100.

Probably of European or west Asiatic origin, but now one of the commonest weeds in cultivated and waste places, nearly all over the globe without the tropics. Abundant in Britain. *Fl. nearly all the year round.*

XXIII. **CRESS.** LEPIDIUM.

Annuals or perennials, glabrous or hairy, with numerous small white flowers. Petals equal. Stamens without appendages. Pods ovate or shortly oblong, rarely orbicular, compressed laterally (at right angles to the *narrow* partition); the valves boat-shaped, either without wings or the keel expanded into a narrow wing at the top. Seeds one in each cell, the radicle usually incumbent on the back of the cotyledons.

A numerous and rather natural genus, widely diffused over the whole range of the Order. It is readily distinguished from *Candytuft* by the small petals all equal, and from all other British siliculose Crucifers, with laterally compressed pods, except *Senebiera*, by the single seeds in each cell.

Pod winged at the top.

Tall annual, with a single stem. Style short 1. *Field C.*

Perennial, branching at the base. Style longer than the notch of the pod 2. *Smith's C.*

Pod not winged.

Stem stout and erect. Leaves oblong or broadly lanceolate.

Upper leaves auricled and clasping the stem. Pod 2 lines broad 3. *Hoary C.*

Upper leaves narrowed at the base. Pod 1 line broad 4. *Broad-leaved C.*

Stem much branched and wiry. Leaves linear or pinnate 5. *Narrow-leaved C.*

The common *Cress* of our gardens is the *L. sativum*, a native of west central Asia.

1. **Field Cress.** *Lepidium campestre*, Br. (Fig. 101.)

(*Thlaspi*, Eng. Bot. t. 1385. *Mithridate Pepperwort*.)



Fig. 101.

An annual or biennial, near a foot high, more or less hoary with minute scaly hairs, or rarely quite glabrous; the stem solitary, erect or nearly so, usually branched in the upper part. Radical leaves stalked, oblong, entire or pinnatifid, with a large terminal lobe; the upper ones oblong or lanceolate, entire or slightly toothed, clasping the stem with short, pointed auricles. Flowers very small. Pods numerous, on spreading pedicels, broadly ovate, thick when ripe, nearly surrounded by the wing, which is narrow at the base, but broad and slightly notched at the top, with a short, often very minute style.

In hilly pastures, cultivated and waste places, over the greater part of Europe, from Sweden to the Caucasus. Generally distributed over England, Ireland, and southern Scotland. *Fl. summer.*

2. Smith's Cress. *Lepidium Smithii*, Hook. (Fig. 102.)

(*Thlaspi hirtum*, Eng. Bot. t. 1803.)

Very near the *field C.*, but forms a more or less perennial stock. The stems are several together, much shorter, and decumbent at the base; the foliage more hairy, the flowers not quite so small, and the pod glabrous.

In hilly pastures, cultivated and waste places in western Europe, from Spain and Portugal, up western France to England, Ireland, and southern Scotland. *Fl. spring and autumn.* It should, perhaps, be united as a mere variety with the *L. hirtum* from south-western Europe, which is hairy all over, including the pods, and the *L. heterophyllum* from western Europe, which is glabrous all over.



Fig. 102.

3. Hoary Cress. *Lepidium Draba*, Linn. (Fig. 103.)

(Eng. Bot. Suppl. t. 2683.)

A perennial about a foot high, more or less hoary with a minute down. The stems stout and erect, branching in the upper part. Leaves oblong or broadly lanceolate, usually slightly toothed, $1\frac{1}{2}$ to 2 inches long, the lower ones stalked, the upper ones clasping the stem with projecting auricles. Racemes not much lengthened, forming a broad flat corymb. Pods about 2 lines broad and not quite so long, very thick, the valves sharply keeled but not winged, the style prominent.

In waste places, by roadsides, etc.; common in central and southern Europe,



Fig. 103.

and temperate Russian Asia. Rare in Britain, and only as an introduced weed in a few English counties. *Fl. spring or early summer.*

4. Broad-leaved Cress. *Lepidium latifolium*, Linn.
(Fig. 104.)

(Eng. Bot. t. 182.)



Fig. 104.

A stout, erect perennial, attaining 2 feet or even more in height, of a pale green, but glabrous. Stems much branched in the upper part, but forming a large loose panicle, not a flat corymb as in the *hoary C.* Radical leaves large, ovate, toothed, on long stalks; stem-leaves oblong or broadly lanceolate, 2 or 3 inches long, the lower ones stalked and mostly toothed, the upper sessile, but tapering at the base, and often entire. Pods about 1 line long and broad, the valves scarcely keeled and not winged, the style almost imperceptible.

In waste places, especially near the sea, widely distributed over central and southern Europe and temperate Russian Asia, extending northwards to Sweden. In Britain, apparently indigenous near the coasts of some of the eastern counties of England, appearing occasionally also in some other localities. *Fl. summer.*

5. Narrow-leaved Cress. *Lepidium ruderales*, Linn.
(Fig. 105.)

(Eng. Bot. t. 1595.)

A glabrous annual, 6 inches to a foot high, with very much branched wiry stems. The radical and lower leaves pinnatifid, with narrow lobes; the upper ones entire or nearly so, and linear. Flowers very minute, generally without petals, and only 2 stamens. Pods small, nearly orbicular; the valves keeled or sometimes very slightly winged at the top; the style very minute.

In dry gravelly soils, waste places, on rubbish and old walls, chiefly

near the sea, nearly all over Europe and Russian Asia, except the extreme north, abundant also in extratropical Australia. In Britain, along the coast of England, from Bristol round to Norfolk, but scarcely wild inland. *Fl.* early summer, and often on till autumn.



Fig. 105.

XXIV. **SENEBIERA.** SENEBIERA.

Prostrate annuals, with pinnate leaves, and short racemes of small white flowers opposite the leaves. Petals and stamens as in *Cress*. Pod laterally compressed (at right angles to the narrow partition), orbicular or broader than long, either indehiscent or separating into two nuts, each with a single seed. Radicle incumbent on the back of the cotyledons, but the bend is, as in *Awlwort*, a little above the base of the cotyledons themselves, not at their junction with the radicle.

A genus of very few species, but widely diffused over the whole range of the Order.

- | | |
|---|---------------------|
| Pods 2 lines broad, deeply wrinkled, sessile or nearly so . . . | 1. <i>Common S.</i> |
| Pods 1 line broad, slightly wrinkled, on slender pedicels . . . | 2. <i>Lesser S.</i> |

1. **Common Senebiera.** *Senebiera Coronopus*, Poir. (Fig. 106.)

(*Coronopus Ruellii*, Eng. Bot. t. 1660. *Swine's-cress*. *Wartercress*.)

A pale green, glabrous or glaucous annual, the stems, when first flowering forming a short, close tuft, afterwards spreading along the ground to the length of 6 inches or more. Leaves once or twice pinnately divided, the segments not numerous, linear or wedge-shaped, entire or toothed. Racemes at first forming close sessile heads, but, as the fruit ripens, lengthening out to 1 or 2 inches. Pedicels seldom a line long. Pod about 2 lines broad and not quite so long, scarcely



Fig. 106.

notched at the top, marked with deep wrinkles, which form a kind of crest round the edge ; it usually remains entire when ripe.

In cultivated and waste places, in central and southern Europe to the Caucasus, extending northward into Sweden. Rather plentiful in southern England and Ireland, decreasing northwards, and quite local in Scotland. *Fl. summer and autumn.*

2. Lesser Senebiera. *Senebiera didyma*, Pers. (Fig. 107.)

(*Lepidium*, Eng. Bot. t. 248.)



Fig. 107.

Much like the *common S.* in habit and foliage, but generally more slender, often sprinkled with a few hairs ; the leaves rather smaller and more divided ; the flowers smaller, in looser racemes. Pod scarcely more than a line broad, but slightly wrinkled, and readily separating into two ovoid nuts.

On the seacoasts of North and South America, South Africa, and western Europe. In Britain, on the southern and western shores of England, from Sussex to Caernarvonshire, and in Ireland. In inland districts only as an occasional straggler. *Fl. all summer.*

XXV. **WOAD.** ISATIS.

Erect annuals or biennials, with undivided leaves, the upper ones clasping the stem, and auricled. The flowers small, yellow, and nume-

rous. Pod flat, pendulous, obovate or oblong, with a strong rib on each side, indehiscent, and containing a single seed. Radicle incumbent on the back of the cotyledons.

A small genus, spread over southern Europe and western Asia.

1. Dyer's Woad. *Isatis tinctoria*, Linn. (Fig. 108.)

(Eng. Bot. t. 97.)

Stems 18 inches to 2 or 3 feet high, branched in the upper part, glabrous and glaucous, or with a few hairs in the lower part. Radical leaves obovate or oblong, coarsely toothed and stalked, 2 to 4 inches long; the upper ones narrow and lanceolate, with prominent auricles. Pods hanging from slender pedicels, generally about 7 or 8 lines long and 2 to 2½ broad, and tapering to the base, but somewhat differing in size and shape according to the variety.

Of south-eastern origin, formerly much cultivated in many parts of Europe and Asia, and has thence become established in stony or waste places, as far north as Sweden. Repeatedly found in several localities in Britain, but scarcely fully naturalized. *Fl. summer.*



Fig. 108.

XXVI. **CAKILE.** CAKILE.

Maritime branching annuals, with fleshy leaves and purplish or white flowers. Pod oblong-linear, somewhat compressed, without any longitudinal partition or valves, but when ripe, separating transversely into 2 articles, the upper one mitre-shaped, deciduous, containing one erect seed; the lower one persistent, not unlike the head of a pike, divided into two points, and containing a pendulous ovule, which seldom enlarges into a seed. Radicle obliquely incumbent on the back or towards the edge of the cotyledons.

A genus consisting of very few species, spread over the seacoasts of the northern hemisphere, both in the new and old world.

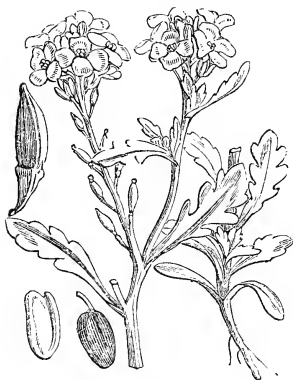
1. **Sea Cakile.** *Cakile maritima*, Scop. (Fig. 109.)(*Bunias Cakile*, Eng. Bot. t. 231. *Sea Rocket*.)

Fig. 109.

Stems hard at the base, with loose straggling branches a foot long or more, and glabrous. Leaves few, thick and fleshy, with a few distant, oblong or linear lobes. Flowers not unlike those of a *Stock*, but smaller. Pods on short thick pedicels, distant from each other in long racemes; when young, linear or lanceolate and entire, but when ripe, forming the two peculiar articles above described. Radicle remarkably large.

In maritime sands and salt-marshes; on all the seacoasts of Europe and western Asia, except the extreme north. Common all round Britain. *Fl. summer and autumn.*

XXVII. **CRAMBE.** CRAMBE.

Erect, stout perennials, or in some foreign species, annuals, with toothed or divided leaves, and loose panicles of white flowers. Pod apparently stalked in the calyx (that is, supported on a stalk-like abortive lower article), globular, indehiscent, with one seed. Radicle incumbent on the back of the cotyledons, which are folded over as in *Brassica*.

A well-characterized and natural genus, containing several south European, west Asiatic, and Canary Island species.

1. **Seakale Crambe.** *Crambe maritima*, Linn. (Fig. 110.)(Eng. Bot. t. 924. *Seakale*.)

A glabrous plant, of a glaucous green, forming a thick, hard, perennial stock. Stems branched, about 2 feet high. Lower leaves stalked, large, rather thick, broadly oblong or rounded, wavy and coarsely toothed or pinnatifid; the upper leaves few and smaller. Panicle large and much branched. Filaments of the longer stamens

forked. Pod 3 or 4 lines in diameter; the abortive article or stalk within the calyx about a line long or rather more.

In maritime sands and stony places, along the western coasts of Europe, and on the Baltic, reappearing on the Black Sea. In Britain, rather thinly scattered along the coasts of England, of Ireland, and of the Scotch lowlands, becoming more scarce northwards. Introduced into our gardens last century, from Devonshire. *Fl.* early summer.



Fig. 110.

XXVIII. **RADISH.** *RAPHANUS*.

Coarse, often hairy annuals or biennials; the lower leaves pinnatifid or pinnate, the flowers rather large. Pod more or less elongated, thick, pointed, indehiscent, more or less contracted or even jointed between the seeds, without any longitudinal partition when ripe, but containing several seeds, separated by a pithy substance filling the pod. Radicle incumbent on the back of the cotyledons, which are folded over it.

A genus well characterized by the pod, but consisting of very few species, or perhaps only of several more or less permanent races of one species. The most distinct form, our garden *Radish*, is unknown in a wild state, but some varieties of the wild one, on the coasts of the Mediterranean, come so near to it as to suggest the possibility that it may be but a cultivated race of the same species, although placed by some botanists in a distinct genus.

1. **Wild Radish.** *Raphanus Raphanistrum*, Linn. (Fig. 111.)

(Eng. Bot. t. 856. *Jointed Charlock*.)

An erect or spreading annual or biennial, 1 to 2 feet high, much

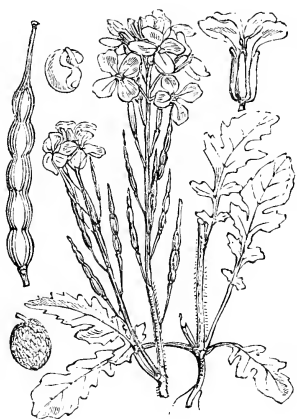


Fig. 111.

branched, with a few stiff hairs on the base of the stem. Leaves pinnately divided or lobed, the terminal segment large, obovate or oblong, and rough with short hairs; the upper leaves often narrow and entire. Flowers of the size of those of the *Charlock*, the calyx very erect, the petals either white, with coloured veins, or pale yellow, or lilac. Pod usually 1 to 1½ inches long, nearly cylindrical when fresh, and terminating in a long, pointed or conical style, when dry more or less furrowed longitudinally, and often separating in joints between the seeds.

A common weed of cultivation, throughout Europe and Russian Asia, except the extreme north, and equally abundant in Britain. *Fl. summer and autumn.* A seacoast variety, particularly abundant round the Mediterranean, but extending up the shores of western Europe to those of England, Ireland, and southern Scotland, has been distinguished as a species, under the name of *R. maritimus* (Eng. Bot. t. 1643). It has the leaves usually more divided, the pods often longer, and is more apt to last a second year, but all the other characters derived from the colour of the flower, the comparative length of the style and pod, the depth of the furrows, etc., occur also on inland specimens, at least on the Continent.

VII. THE MIGNIONETTE FAMILY. RESEDACEÆ.

A small family, limited in Britain to the single genus *Mignonette*. The exotic genera, of very few species each, associated with it, originally formed part of it, but have been separated on account chiefly of the slight differences in the structure of the fruit.

I. MIGNIONETTE. RESEDA.

Herbs, either annual or with a short perennial stock, alternate leaves, no stipules, and small greenish-yellow or white flowers, in long terminal racemes or spikes. Sepals 4 to 6, united at the base. Petals as many, small, narrow, and some or all of them deeply divided. Stamens in-

definite, but not numerous (about 8 to 24), inserted under the ovary on a glandular disk. Ovary single, with short teeth, each terminating in a very short style or sessile stigma. Capsule green, open at the top long before maturity, containing several seeds, arranged along as many parietal placentas as there were styles. Seeds without albumen.

The species are not numerous, and chiefly confined to Europe, northern Africa, and western Asia. The narrow, insignificant, divided petals, and open capsule, are sufficient to distinguish them from all other British plants.

Leaves entire 1. *Dyer's M.*

Leaves cut or divided.

Petals white, all divided. Leaves pinnate, with many entire segments 3. *White M.*

Petals greenish-yellow, one or two of them undivided.

Leaves trifid or pinnate, with few segments, often again divided 2. *Cut-leaved M.*

The *sweet Mignonette* of our gardens (*R. odorata*) is a native of Egypt, nearly allied to the *cut-leaved M.*

1. *Dyer's Mignonette. Reseda Luteola*, Linn. (Fig. 112.)

(Eng. Bot. 320. *Weld, Yellow Weed, or Dyer's Rocket.*)

An erect glabrous annual or biennial, with a hard, stiff, scarcely branched stem, 1 to 2 feet high. Leaves linear or lanceolate, 2 to 3 inches long, entire, but slightly waved on the edges. Flowers of a yellowish green, in long, stiff spikes. Sepals 4. Petals 4 or 5, very unequal, the 1 or 2 lower ones entire, the upper ones divided into 2 to 5 lobes. Capsules nearly globular, with 3 or sometimes 4 teeth, and twice as many external furrows.

In waste places, throughout temperate and southern Europe, from Sweden to the Caucasus. Extends over the greater part of Britain, but decreases northward, although found occasionally as far as Aberdeen. Long cultivated for the use of dyers, it may not improbably be an introduced plant with us, as in northern Europe generally. *Fl. summer.*



Fig. 112.

2. Cut-leaved Mignonette. *Reseda lutea*, Linn. (Fig. 113.)
(Eng. Bot. t. 321.)



Fig. 113.

Not so tall as the *dyer's M.*, much more branched, and less erect. Leaves very variable, but always deeply divided, most of them once or twice trifid, but occasionally pinnatifid, with few oblong or linear segments, much waved on the margins. Flowers on slender pedicels, in long racemes. Sepals usually 6, but sometimes only 5. Petals as many, of a greenish yellow, the lowest entire or 2-cleft, the others irregularly divided into 2, 3, or 4. Capsule oblong, with 3, rarely 4, very short teeth.

In waste places, especially in limestone districts, in central and southern Europe, to the Caucasus. In Britain, chiefly prevalent in south-eastern England, but extends also to the limestones of the western and northern counties of England, into Ireland, and up the east coast of Scotland to Aberdeen. *Fl. summer.*

3. White Mignonette. *Reseda alba*, Linn. (Fig. 114.)
(*R. fruticulosa*, Eng. Bot. Suppl. t. 2628.)



Fig. 114.

A tall perennial, the lower leaves crowded on the stock or base of the stem, and all deeply pinnate, with numerous (9 to 21) linear or lanceolate segments, entire, but waved on the margins. Flowers on short pedicels, much whiter than in the last two species. Sepals 5 or 6. Petals as many, all equal, and 3-cleft. Capsule ovoid, with 4, or sometimes 3, 5, or 6 teeth.

A Mediterranean species, long since introduced into our cottage gardens, and, as an outcast from them, appears to have become naturalized in some parts of the south coasts of England and Ireland. *Fl. summer.*

VIII. THE CISTUS FAMILY. CISTINEÆ.

Shrubs or herbs, with opposite, or in a few exotic species, alternate leaves, with or without stipules; the flowers in terminal racemes. Sepals 3, nearly equal, overlapping each other in the bud, with or without 2 smaller outer ones. Petals 5, or rarely fewer, broadly spreading. Stamens numerous, hypogynous, and free. Ovary and style single. Capsule 1-celled, or incompletely divided into several cells, opening in 3, 5, or 10 valves, which bear along their centre as many placentas or imperfect partitions. Seeds several, the embryo curved, imbedded in albumen.

A small Order spread chiefly over southern and western Europe and northern Africa, with a few American species. It corresponds with the old Linnean genus *Cistus*, which is now limited to the large-flowered species with 5 valves to the capsule. They are none of them British, but include the well-known *Gum-Cistuses* of our gardens.

I. **ROCKCIST.** HELIANTHEMUM.

Low or diffuse undershrubs or herbs, with the flowers smaller than in the true *Cistuses*, and the capsule opening in 3 valves only. The leaves in the British species are all opposite, and the two outer sepals very seldom wanting.

The geographical range is the same as that of the family.

Erect annual 1. *Spotted R.*

Diffuse, much branched undershrubs.

No stipules to the leaves (flowers small) 2. *Hoary R.*

A pair of stipules at the base of each leaf.

Leaves green above, nearly flat. Flowers usually yellow 3. *Common R.*

Leaves whitish on both sides, the edges rolled back.

Flowers always white 4. *White R.*

1. **Spotted Rockcist.** *Helianthemum guttatum*, Mill.
(Fig. 115.)

(*Cistus*, Eng. Bot. t. 544.)

An erect, hairy annual, often branched at the base, from a few inches to near a foot high. Leaves narrow-oblong or lanceolate, or the lower ones obovate and very obtuse; the upper ones more pointed, and often accompanied by stipules, which are wanting to the lower ones. Ra-

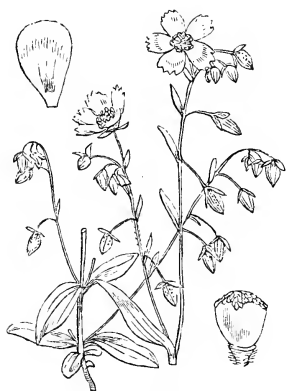


Fig. 115.

cemes loose, with small flowers on slender pedicels. Petals very fugacious, yellow, either with or without a dark spot at their base, varying also in size, and in their edges entire or jagged.

In pastures, fields, and waste places, very common in western and southern Europe, extending northward through France to the Channel Islands, and southern Ireland, and reappearing on the Holyhead mountain in Anglesea. *Fl. summer.* The Anglesea specimens are rather stunted, with the leaves broader than usual, and have been published as a species under the name of *H. Breweri*.

2. Hoary Rockcist. *Helianthemum canum*, Dun. (Fig. 116.)

(*Cistus marifolius*, Eng. Bot. t. 396.)



Fig. 116.

A much smaller and more compact undershrub than the *common R.* The leaves much smaller, seldom 6 lines long, white underneath, or sometimes on both sides, and all without stipules. Racemes numerous and short, with small bracts at the base of the pedicels. Flowers yellow, very much smaller than in the *common R.*

In rocky, hilly districts, in central, western, and south-western Europe, from southern Sweden to Spain. Rather rare in Britain, on limestone rocks in western and north-western England, and in the isle of Arran on the coast of Ireland. *Fl. summer.*

3. Common Rockcist. *Helianthemum vulgare*, Gærtn. (Fig. 117.)

(*Cistus Helianthemum*, Eng. Bot. t. 1321. *C. tomentosus*, Eng. Bot. t. 2208. *Rock-rose*)

A low, diffuse undershrub, with a short, much branched, woody

stem, and annual procumbent or ascending flowering branches, from a few inches to near a foot long. Leaves shortly stalked, mostly oblong, but varying from ovate to lanceolate, scarcely curved down on the edges, glabrous or slightly hairy, green above, and more or less hoary or white underneath. Stipules linear-lanceolate, 1 to 2, or even 3 lines long. Racemes loose, the pedicels deflected before and after flowering. The 3 larger sepals marked with 3 very prominent ribs, and often scarious between them; the 2 outer very small. Petals broadly spreading, bright yellow, near 6 lines long and broad.



Fig. 117.

In dry meadows and pastures, throughout Europe and western Asia, except the extreme north. Not uncommon in England, Ireland, and southern Scotland. *Fl. all summer.* A curious variety, or rather an accidental deformity, occasionally seen in gardens, and supposed to have been originally found near Croydon in Surrey, with small, narrow, deeply-cut petals, has been figured under the name of *H. surrejanum* (Eng. Bot. t. 2207). The *Rock-roses* of our gardens are chiefly varieties of this species, which, under cultivation, varies much in the colour of its flowers.

4. White Rockcist. *Helianthemum polifolium*, Pers. (Fig. 118.)

(*Cistus*, Eng. Bot. t. 1322.)

Very near the *common R.*, and by some considered as one of its numerous varieties. It is less straggling, the leaves are narrow, much rolled back on the edges, and hoary on both sides, and the flowers are always white.

On limestone, rocky wastes, common in south-western and some parts of central Europe. In Britain only on Brent Downs in Somersetshire, and at Torquay and Babbicombe in Devonshire. *Fl. summer.*

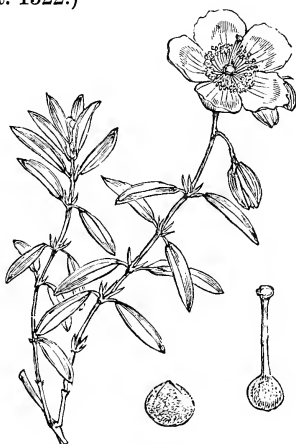


Fig. 118.

IX. THE VIOLET FAMILY. VIOLARIÆ.

A family limited in Europe to the single genus *Violet*. The exotic genera associated with it agree with it in their 5 sepals and petals, their 5 anthers placed on the inner surface of the short, broad filaments, and their 1-celled ovary with three parietal placentas. They are chiefly tropical, and many are trees or shrubs, with small, almost regular flowers.

I. VIOLET. VIOLA.

Low annuals or perennials, with stipulate, radical, or alternate leaves, and (in the British species) axillary or radical 1-flowered peduncles. Sepals 5, produced at the base beyond their insertion. Corolla irregular, of 5 spreading petals, the lowest produced into a spur at the base. Stamens 5, the filaments very short and broad, bearing the anthers on their inner surface, and more or less cohering in a ring round the ovary, the two lower ones lengthened into a short spur at the base. Style single, with a dilated or thickened or hooked stigma. Ovary 1-celled, with several ovules inserted on 3 parietal placentas. Fruit a capsule, opening in 3 valves, which become folded lengthwise so as to clasp tightly the shining seeds.

A considerable genus, widely spread over the greater part of the globe, and readily distinguished by the stamens and spurred flowers from all British Polypetals except *Balsam*, which is at once known by the number and shape of the sepals and petals. In all the British species, except the *Pansy*, the showy, perfect flowers seldom set their fruits. The capsules and seeds are generally produced by minute flowers, almost without petals or stamens, which appear later in the year

Sepals obtuse. Flowers and leaves apparently radical. Stem very short.

Leaves glabrous, reniform. Flowers small, scentless . . . 1. *Marsh V.*
Leaves more or less downy or hairy.

Flowers sweet-scented. Lateral scions creeping . . . 2. *Sweet V.*

Flowers scentless. No creeping scions. Leaves very hairy 3. *Hairy V.*
Sepals acute. Annual flowering branches more or less elongated.

Stipules narrow, entire, ciliate or toothed. Stigma hooked and pointed . . . 4. *Dog V.*

Stipules deeply divided. Stigma thickened, with a tuft of hairs below it . . . 5. *Pansy V.*

The *V. calcarata* from the Alps, the *V. cornuta* from the Pyrenees,

and occasionally a few other exotic species, may be met with in our gardens.

1. **Marsh Violet.** *Viola palustris*, Linn. (Fig. 119.)

(Eng. Bot. t. 444.)

The stock occasionally emits runners or scions, like the *sweet V.*, but it is a smaller plant, and perfectly glabrous, except very rarely a few hairs on the peduncles. Leaves reniform or orbicular, and cordate at the base, very slightly crenate. Flowers smaller than in the *sweet V.*, of a pale blue, with purple streaks, and quite scentless; the sepals obtuse, the spur very short. Stigma broad, oblique.

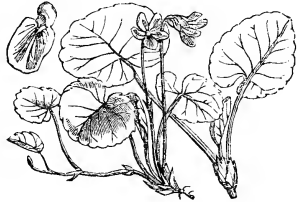


Fig. 119.

In marshy ground and bogs, widely distributed over northern and central Europe, Russian Asia, and North America. Abundant in Scotland, but decreasing southwards, and quite local in southern England. Common in some parts of Ireland. *Fl. spring and early summer; the petalless flowers in summer.*

2. **Sweet Violet.** *Viola odorata*, Linn. (Fig. 120.)

(Eng. Bot. t. 619.)

Perennial stock short, but sometimes branched, knotted with the remains of the old leaf-stalks and stipules, and usually emitting creeping runners or scions. Leaves in radical (or rather, terminal) tufts, broadly cordate, rounded at the top, and crenate, downy or shortly hairy, with rather long stalks. Stipules narrow-lanceolate or linear, and entire. Peduncles about as long as the leaf-stalks, with a pair of small bracts about halfway up. Flowers nodding, of the bluish-purple colour named after them, or white, more or less sweet-scented. Sepals obtuse. Spur of the lower petal short. Stigma pointed, horizontal or turned downwards.



Fig. 120.

On banks, under hedges, in woods, and on the borders of meadows, widely spread over Europe and Russian Asia, extending northward to

southern Sweden. Common in many parts of Britain, although here and there large districts are without it. *Fl. early spring, or some garden varieties in autumn; the small petalless flowers that produce the seeds may be seen nearly all summer.* Some Continental botanists distinguish several species from minute differences in the shape and hairs of the petals.

3. Hairy Violet. *Viola hirta*, Linn. (Fig. 121.)

(Eng. Bot. t. 894.)



Fig. 121.

Very near the *sweet V.*, and most probably a mere variety, seldom producing runners, more hairy in all its parts, with narrower and less obtuse leaves, and scentless flowers.

Chiefly in limestone districts, in rocky places, open woods, and pastures, with a more extended area than the *sweet V.*, penetrating further north in Scandinavia, and yet more common in southern Europe to the Caucasus. Appears more frequent in eastern Britain, and less so in the west, than the *sweet V.*; both are recorded from Ireland. *Fl. rather later than the sweet V.*

4. Dog Violet. *Viola canina*, Linn. (Fig. 122.)

(Eng. Bot. t. 620. *V. sylvatica* and *V. stagnina*, Bab. Man.)



Fig. 122.

Stock short, with the radical leaves tufted, and the flowering branches at first so short as to give the plant much resemblance to the *sweet V.*; but as the season advances, the lateral flowering branches are always more or less elongated, ascending or erect, from a few inches to near a foot long. Leaves ovate, cordate, varying from nearly orbicular to broadly lanceolate, usually glabrous as well as the whole plant. Stipules narrow-lanceolate and pointed. Flowers much like those of the *sweet V.*, but usually paler, always scentless, and the sepals pointed. The complete flowers set their fruit more frequently

than in the *sweet V.*, but yet the greater number of capsules are produced by the later petalless flowers.

Very common in a variety of situations, throughout Europe and Russian Asia. Abundant in Britain. *Fl. spring and early summer; the petalless flowers all summer.* It varies much in size, in the shape of the leaves, and in the mode of development of the flowering branches, and has been divided into a number of species, which may be reduced to three principal varieties, viz. :—

a. *Dwarf Dog Violet* (*V. flavicornis*, Eng. Bot. Suppl. t. 2736). Usually only 2 or 3 inches high, the flowering branches frequently perennial at the base, and the capsules almost always obtuse, being produced by the petalless flowers. Grows in open, dry, or sandy situations.

b. *Common Dog Violet*. Six inches high or more, the flowering branches all lateral. Leaves ovate, cordate. Capsules often pointed, and produced by the complete flowers. On hedge-banks and in thickets.

c. *Narrow-leaved Dog Violet* (*V. lactea*, Eng. Bot. t. 445). Flowering branches more erect than in the common variety, often much longer, although sometimes short. Leaves ovate-lanceolate, from one and a half to three times as long as broad, and cordate at the base. Flowers very pale or white. Very luxuriant on boggy heaths, dwarf near the seaside.

5. Pansy Violet. *Viola tricolor*, Linn. (Fig. 123.)

(Eng. Bot. t. 1287. *Heartsease* or *Pansy*.)

A most variable plant, but easily recognized by the branching stem, the large leaf-like stipules deeply divided into several linear or oblong lobes, the central or terminal one the largest, broadest, and most obtuse, and by the style thickened at the top into an almost globular oblique stigma. The plant is glabrous, or slightly downy. Leaves stalked, from narrow-oblong to ovate or cordate, always obtuse and slightly crenate. Flowers purple, whitish, or yellow, or with a mixture of these colours; the two upper pairs of petals slightly overlapping each other, and usually more coloured, the lower petal always broadest, and generally yellow at the base.



Fig. 123.

On hilly pastures and banks, in cultivated and waste places through-

out Europe and Russian Asia, and abundant in Britain, especially as a weed of cultivation. *Fl. from spring till autumn*. It is the most variable of all our *Violets*, and has been divided into more than a dozen species. The following are the most prominent forms, which, however constantly different they may sometimes appear, at others pass gradually into each other.

a. *Field Pansy* (*V. arvensis*, Eng. Bot. Suppl. t. 2712). A slender annual, from 2 or 3 inches to 6 inches or a foot long. The lobes of the stipules and leaves narrow; the petals small, sometimes shorter than the calyx, pale yellow, nearly white, or the upper ones pale purple. A very common weed of cultivation.

b. *Garden Pansy* (*V. tricolor*, Eng. Bot. t. 1287). Larger than the *field P.* in all its parts, often biennial or perennial, with broader leaves. The terminal lobe of the stipules larger; the petals much larger than the calyx, very variable in colour. It sows itself readily, but is apt to degenerate into the *field P.*

c. *Yellow Pansy* (*V. lutea*, Eng. Bot. t. 721). Usually perennial. Foliage of the compact forms of the *garden P.* Flowers large and richly coloured, often yellow. In mountain pastures in Wales, northern England, and western Scotland. *V. Curtisii* (Eng. Bot. Suppl. t. 2693) is an intermediate form between this and the *garden P.*

X. THE MILKWORT FAMILY. POLYGALACEÆ.

A family represented in Europe only by *Milkwort* itself. The other genera associated with it are chiefly tropical or natives of the southern hemisphere, differing from *Milkwort* in the form and consistence of their fruit, or in minor details in the structure of their flowers.

I. MILKWORT. POLYGALA.

Herbs or shrubs, with entire leaves, usually alternate, no stipules, and very irregular flowers in terminal racemes. Sepals 5, of which the two inner are larger, usually petal-like, and commonly called *wings*. Petals 3, 4, or 5, the lowest very small and subulate, and all more or less united with the stamens. Stamens united in two parcels, each with 4 anthers opening by pores at the summit. Style 1, with a single stigma. Ovary and capsule flat, 2-celled, with a single pendulous seed in each cell.

A very numerous genus, widely diffused over most parts of the globe.

Several of the showy south African species are often cultivated in our greenhouses.

1. **Common Milkwort.** *Polygala vulgaris*, Linn. (Fig. 124.)

(Eng. Bot. t. 76, and Suppl. t. 2827, and *P. amara*, Eng. Bot. Suppl. t. 2764. *Milkwort*.)

A glabrous or nearly glabrous perennial, with a short-tufted or almost woody stock, and numerous diffuse or ascending branches, from an inch or two to near a foot long. It will also occasionally flower the first year, so as to appear annual. Leaves crowded at the base, the lowest obovate or even orbicular, especially in young plants, the upper ones oblong-lanceolate, or even linear, 2 or 3 lines to near an inch long. Flowers usually bright blue or pink, hanging on short pedicels in elegant terminal racemes, with a small bract at the base of each pedicel. Three outer sepals small, linear, and greenish, the 2 *wings* twice as large, obovate or oblong, coloured and elegantly veined; after flowering they lie flat on the capsule, but become greener. Petals much smaller, the 2 lateral oblong-linear, the lowest keel-shaped, and tipped with a little crest. Style dilated at the top. Capsule green, orbicular, surrounded by a narrow wing, notched at the top. Seeds oblong, downy.

In meadows and pastures, on banks, under hedges, etc., throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. all summer*. It varies much in the relative size of the lower and upper leaves, in the size and colour of the flowers, in the veins and the breadth of the wings, etc., and many forms which have appeared constant in particular localities, have at various times been characterized as species.



Fig. 124.

XI. THE FRANKENIA FAMILY. FRANKENIACEÆ.

An Order limited to the genus *Frankenia*, which differs from the *Pink* family in the parietal placentas of the ovary and capsule,

and from the *Hypericum* family in its valvate calyx, definite stamens, and in habit.

I. **FRANKENIA.** FRANKENIA.

Prostrate or spreading seacoast herbs or undershrubs, with opposite, often clustered, small leaves, and no stipules, the flowers sessile in the upper axils. Sepals combined into a tubular calyx, with 4 or 5 teeth. Petals 4 or 5, with long claws and spreading laminas. Stamens 4 or 5, alternating with the petals, and usually 2 or 3 additional ones opposite the petals. Ovary single, with one style, shortly 2-, 3-, or 4-cleft. Capsule opening in 2, 3, or 4 valves. Seeds attached to the centre of the valves, very small, with a straight embryo imbedded in albumen.

A genus of few species, but widely spread over the seacoasts of nearly all the temperate and warmer regions of the globe.

1. **Common Frankenia.** *Frankenia lævis*, Linn. (Fig. 125.)

(Eng. Bot. t. 205. *Sea-Heath*.)

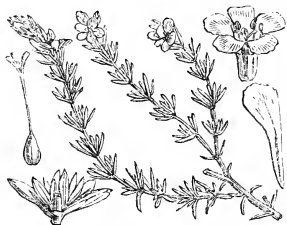


Fig. 125.

A diffuse, much-branched perennial, spreading to the extent of 6 or 8 inches; glabrous or nearly so in the British specimens. Leaves crowded in little opposite clusters along the branches, small, rather thick, and appearing linear from their edges being closely rolled down. Flowers few, sessile among the upper leaves, forming little terminal leafy heads or short spikes. Calyx furrowed,

about the length of the leaves. Petals small, pink.

In maritime sands and salt-marshes, common round the Mediterranean and in central Asia, and extends up the western coasts of Spain and France. Varieties of what is now considered as the same species are abundant in similar localities in the southern hemisphere. In Britain only on the south-eastern coasts of England. *Fl. summer*. The hairy variety, often distinguished as a species, common in the south, does not appear to extend to Britain.

XII. THE PINK FAMILY. CARYOPHYLLACEÆ.

Annual or perennial herbs, with opposite entire leaves and no stipules, or, in a very few genera, small scarious stipules; the

branches usually knotted at each pair of leaves; the flowers not yellow, usually in dichotomous cymes or panicles. Sepals 4 or 5, free or united into a tubular calyx. Petals as many, twisted in the bud, sometimes minute or wanting. Stamens free, twice as many as the petals, or fewer, inserted under the ovary. Styles 2 to 5, linear, stigmatic along their whole length. Capsule 1-celled, or divided into cells at the base only, opening at the top into as many, or twice as many teeth or valves as there are styles, and containing several seeds, attached to a shorter or longer central column.

A considerable family, widely spread over the globe, most numerous in temperate regions, especially in the northern hemisphere, extending into the Arctic Circle, and to the summits of the Alps, but rare within the tropics. The species are readily distinguished by their foliage and habit from all British polypetalous plants, except *Frankenia*, *Elatine*, and the *cathartic Flax*, which have their ovary and capsule completely divided into cells, and the *Paronychia family*, which have but one seed in the ovary and capsule.

The genera into which the species are distributed are often very artificial, depending on the number of sepals, petals, stamens, or styles. These numbers are not indeed strictly constant, even in different flowers of the same individual; but in general by far the greater number of flowers in each individual will be found to agree in this respect with the characters assigned to the genus to which it belongs. Care must therefore be taken, especially in the smaller-flowered *Alsineæ*, to count the number of parts in several flowers wherever any hesitation is felt as to the genus it should be referred to.

Suborder 1. SILENEÆ.

Sepals united in a tubular or campanulate calyx.

Two or four scales or bracts closely embracing the base or

the whole of the calyx 1. PINK.

No scales at the base of the calyx.

Styles 2 2. SAPONARIA.

Styles 3 3. SILENE.

Styles 5 (rarely 4) 4. LYCHNIS.

Suborder 2. ALSINEÆ.

Sepals free, or only very slightly connected at the base.

Small, white, scaly stipules at the base of the leaves.

Styles 3. Leaves linear, cylindrical, opposite, not clus-

tered 12. SANDSPURRY.

- Styles 3. Leaves flat, the upper ones apparently 4 in a whorl 14. POLYCARP.
- Styles 5. Leaves linear, cylindrical, clustered so as to appear many in a whorl 13. SPURRY.
- Leaves without any scales or stipules at the base.
- Petals entire or slightly jagged or none.*
- Sepals 4 or 5, with the same number of styles.
- Capsule opening in 4 or 5 valves. Small, matted, fine-leaved plants 5. PEARLWORT.
- Capsule opening at the top, in 8 or 10 teeth.
- Plant glabrous, stiff, and erect. Petals quite entire 8. MÆNCHIA.
- Plant downy, much branched. Petals slightly notched 10. CERAST.
- Sepals 5. Styles 3 (rarely 4).
- Petals none. Alpine, moss-like plant 6. CHERLERIA.
- Petals obovate or oblong (sometimes very small).
- Petals quite entire 7. SANDWORT.
- Petals slightly jagged 9. HOLOSTEUM.
- Petals 2-cleft.*
- Styles 3.
- Capsule opening to below the middle, in 6 valves 11. STARWORT.
- Capsule opening at the top, in 6 short teeth. Alpine plant, with narrow leaves STARWORT CERAST.
- Styles 5, rarely 4.
- Stem-leaves sessile. Capsule opening in 10 or 8 short teeth 10. CERAST.
- Stem-leaves cordate, stalked. Capsule opening in 5 entire or shortly split valves WATER STARWORT.

Among exotic genera, several *Gypsophylls*, from south-eastern Europe, are occasionally cultivated in our flower-gardens, and *Cucubalus baccifer* (Eng. Bot. t. 1577), from central and southern Europe, is said to have been formerly found in the Isle of Dogs, introduced with ballast.

I. PINK. DIANTHUS.

Stiff perennials, or more rarely annuals, with narrow leaves. Calyx tubular, 5-toothed, clasped at the base or covered by 2, 4, or 6 broad scales or bracts. Petals usually crenate, or jagged. Stamens 10. Styles 2. Capsule stalked within the calyx, opening at the top in 4 teeth or short valves.

A considerable genus, spread over Europe and Asia, with a few South African species. It is also one of the most natural in the family, readily known by the scales under the calyx.

Annuals. Flowers small, clustered together, the scales as long as the calyx.

Plant glabrous. Scales broad, dry, and scarious . . . 1. *Proliferous P.*

Plant slightly downy. Scales narrow, herbaceous, with long points 2. *Deptford P.*

Perennials. Flowers few on each stem, distinct, the scales much shorter than the calyx.

Lower leaves not half an inch long, green, and loosely tufted. Calyx-teeth and scales pointed. Flowers scentless 3. *Maiden P.*

Lower leaves near an inch, stiff, and glaucous. Calyx-teeth and scales broad, obtuse, or with minute points. Flowers scented 4. *Cheddar P.*

Among the exotic species cultivated in gardens, are the *Sweet-William* (*D. barbatus*), the *Carnation* and *Clove Pink* (varieties of *D. Caryophyllus*), the *Pheasant's-eye Pink* (*D. plumarius*), all from central or southern Europe, and the two last said to establish themselves occasionally half wild on old walls, the *Indian Pink* (*D. sinensis*), etc.

1. *Proliferous Pink. Dianthus prolifer*, Linn. (Fig. 126.)

(Eng. Bot. t. 956.)

A stiff, erect, wiry, glabrous annual, simple, or with a few erect branches, 6 inches to a foot high or rather more. Leaves few, narrow, erect, and mostly pointed. Flowers small, in compact, oblong or ovoid, terminal heads, the calyx quite concealed by broad, dry, shining, almost scarious, imbricated scales, from the top of which appear the small, spreading, pink petals.

On dry, hilly pastures, roadsides, etc., in central and southern Europe, from southern Sweden to the Caucasus. In Britain, confined to a few spots in southern and eastern England. *Fl. summer and autumn.*



Fig. 126.

2. *Deptford Pink. Dianthus Armeria*, Linn. (Fig. 127.)

(Eng. Bot. t. 317.)

An erect annual, rather more than a foot high, slightly branched, and more or less downy with very short hairs. Leaves more herbaceous



Fig. 127.

than in most *Pinks*, 1 to 2 or even 3 inches long, obtuse, or the upper ones pointed. Flowers small and scentless, in terminal clusters. Calyx 8 or 9 lines long, the teeth fine and pointed, the outer scales broad at the base, but tapering into fine green points, often projecting beyond the calyx. Petals narrow, pink, with white dots, crenate on the edge.

On pastures, in waste places, under hedges, etc., in central and southern Europe to the Caucasus, and northward to southern Sweden. Not common in Britain, although it has been found in several English and in a few of the southern Scotch counties. *Fl. summer.*

3. Maiden Pink. *Dianthus deltoides*, Linn. (Fig. 128.)

(Eng. Bot. t. 61.)

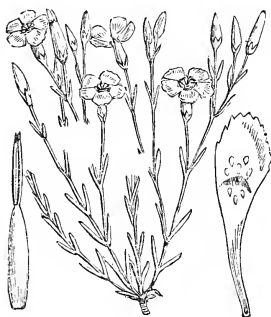


Fig. 128.

A low perennial, forming a loose, diffuse, leafy tuft, not of many years' duration; the flowering stems ascending, glabrous, or slightly hoary, 6 inches to near a foot long, usually forked above the middle. Leaves seldom half an inch long, green and glabrous, obtuse, or the upper ones scarcely pointed. Flowers not large, scentless, pink or spotted with white, solitary or two together, on short peduncles. Calyx 6 or 7 lines long, with pointed teeth, the outer scales broad, with a narrow point reaching to a third or near half of the length of the calyx.

On banks, open pastures, etc., in Europe and western Asia, penetrating further north into Scandinavia than the two last. More generally distributed over Britain, and abundant in some localities, but wanting in many counties, and only recorded in a very few stations in Ireland. *Fl. all summer.* It varies with 2 or 4 scales to the calyx, and has sometimes white flowers.

4. **Cheddar Pink.** *Dianthus cæsius*, Linn. (Fig. 129.)

(Eng. Bot. t. 62.)

A perennial, of a very glaucous hue, forming a short, densely tufted, often almost woody stock. Lower leaves crowded, stiff, seldom above an inch long, narrow-linear, but obtuse. Flower-stems erect, 5 or 6 inches or rarely near a foot high, simple and 1-flowered, or rarely forked, bearing a few leaves more pointed than the lower ones. Flowers rather large, fragrant. Calyx rather thick, with short teeth, the outer scales 4, broad, very shortly pointed, not half so long as the calyx. Petals broad, irregularly crenate, usually with a few hairs on the inside.

On limestone or volcanic rocks, in various parts of western, central, and southern Europe, but usually very local. In Britain, confined to the Cheddar rocks in Somersetshire. *Fl. June and July.*



Fig. 129.

II. **SAPONARIA.** SAPONARIA.

Calyx, corolla, and stamens of *Lychnis*. Styles 2. Capsule opening at the top in 4 teeth or short valves.

This genus, artificially distinguished by the number of styles, comprises several European and west Asiatic species, among which the *S. ocymoides* and *S. calabrica* are frequently cultivated in our flower-gardens, and *S. Vaccaria*, a common cornfield weed in Continental Europe and central Asia, remarkable for its angular calyx and small pink flowers, is said to have appeared occasionally in our own cornfields.

1. **Common Saponaria.** *Saponaria officinalis*, Linn. (Fig. 130.)(Eng. Bot. t. 1060. *Soapwort*.)

A glabrous perennial, with several stout, leafy, erect stems, from 1 to 2 feet high. Leaves ovate or elliptical, 2 to 3 inches long, strongly marked with 3 or 5 ribs, and narrowed at the base into a very short, broad stalk. Flowers large and handsome, of a pale pink, or nearly



Fig. 130.

white, in dense corymbs or heads at the summit of the stems, surrounded by small lanceolate floral leaves or bracts. Calyx tubular, about 9 or 10 lines long. Petals obcordate.

On banks, roadsides, and waste places, throughout central and southern Europe and western Asia. Abundant in some parts of England, Ireland, and southern Scotland, about villages and habitations, probably introduced from cultivation, but perhaps really native on the coasts of Cornwall and Devon. *Fl. summer.*

III. **SILENE.** SILENE.

Calyx, corolla, and stamens of *Lychnis*. Styles 3. Capsules opening at the top in 6 teeth or short valves.

A very numerous genus, widely spread over Europe, Russian and central Asia, and North America, with a few south African species. It is very artificially distinguished from *Saponaria* and *Lychnis* by the number of styles, and the popular names of *Catchfly* and *Campion* each include species of both *Silene* and *Lychnis*. It has been proposed to abandon the character derived from the styles, and to distinguish these two genera by the number of the teeth or valves of the capsule, the same as that of the styles in *Lychnis*, twice as many in *Silene*, thus transferring the *red* and *white Lychnises* to *Silene*, but this would scarcely render the genera less artificial.

Calyx glabrous. Leaves glabrous or slightly downy.

Moss-like alpine plant, with very short tufted stems . . . 1. *Dwarf S.*
Stem elongated.

Calyx much inflated after flowering, ovoid or globular . . . 2. *Bladder S.*

Calyx short, not inflated. Flowers numerous, small . . . 3. *Spanish S.*

Calyx and foliage downy or hairy.

Perennials.

Calyx short. Flowers small, numerous, in opposite bunches or whorls 3. *Spanish S.*

Calyx tubular. Flowers rather large, nodding, on opposite peduncles, forming loose panicles 4. *Nodding S.*

Annuals. Calyx contracted at the top, with narrow teeth.

Flowers axillary, forming unilateral spikes. Calyx

10-ribbed. 5. *Small-flowered S.*

Flowers in terminal dichotomous panicles, or solitary.

Calyx conical, 25- to 30-ribbed 6. *Striated S.*

Calyx long and tubular, 10-ribbed 7. *Night S.*

Two south European species, *S. italica* (*S. patens*, Eng. Bot. Suppl. t. 2748) and the *Lobel's Catchfly* (*S. Armeria*, Eng. Bot. t. 1398), appear to have occasionally escaped from gardens, and sown themselves in some localities. Several other exotic species, especially *S. compacta*, *S. vespertina*, *S. rubella*, *S. Shafta*, etc., are frequent ornaments of our flower-beds.

1. Dwarf Silene. *Silene acaulis*, Linn. (Fig. 131.)

(Eng. Bot. t. 1081. *Moss Campion*.)

This beautiful little mountain plant forms dense moss-like tufts, often many inches diameter, consisting of a much branched perennial stock, the very short branches covered with the remains of old leaves, and crowned by dense spreading clusters of short, green, linear, and glabrous leaves. From the centre of these arise the numerous flowers, either



Fig. 131.

sessile or on 1-flowered peduncles, which seldom attain an inch in length. Calyx broadly tubular or campanulate, quite glabrous, with rather obtuse teeth. Petals reddish-purple, obovate, slightly notched, with a small scale at the base of the lamina.

In the mountains of northern and Arctic Europe, Asia, and America, and, at considerable elevations, on the great mountain-ranges of central and southern Europe. Abundant in the mountains of Scotland and northern Ireland, extending more sparingly into the Lake district of England and into North Wales. *Fl. summer*.

2. Bladder Silene. *Silene inflata*, Sm. (Fig. 132.)

(*Cucubalus Behen*, Eng. Bot. t. 164. *Bladder Campion*.)

A perennial, loosely branched at the base, with ascending or seldom erect stems, from 6 inches to above a foot long, of a glaucous green, and usually glabrous. Leaves ovate, oblong, or rarely nearly linear, and usually pointed. Flowers few, white, erect or slightly drooping,



Fig. 132.

in loose terminal panicles. Calyx rather more than half an inch long, becoming at length almost globular, inflated and much veined. Petals more or less deeply 2-cleft, with a small scale at the base of the lamina, which sometimes disappears altogether.

In fields, on banks, roadsides, and waste places, throughout Europe and Russian and central Asia, extending into the Arctic regions and to high alpine summits. Generally spread over Britain, but not every common. *Fl. all summer*. A seacoast variety, with short diffuse stems, thicker, more obtuse leaves, and almost solitary flowers, has been distinguished as a species, under the name of *S. maritima* (Eng. Bot. t. 957).

3. Spanish Silene. *Silene Otites*, Sm. (Fig. 133.)

(*Cucubalus*, Eng. Bot. t. 85.)



Fig. 133.

Perennial stock short and tufted, with narrow leaves, as in the *nodding S.*; the stems simple, erect and stiff, with few leaves, about a foot high. Flowers dioecious, small and numerous, of a pale yellowish green, arranged in loose, opposite clusters, having the appearance of whorls, and forming a long, narrow panicle. Calyx scarcely $1\frac{1}{2}$ lines long. Petals narrow and entire. Style and stamens projecting beyond the flower.

In sandy fields and pastures, in central, southern, and especially eastern Europe, and all across Russian Asia, not so common in western Europe, although extending to the sandy shores of the Atlantic. In Britain only in Norfolk, Suffolk, and Cambridgeshire. *Fl. summer*.

4. **Nodding Silene.** *Silene nutans*, Linn. (Fig. 134.)

(Eng. Bot. t. 465, *not good.* *Nottingham Catchfly.*)

Stock tufted and perennial, with a rather thick taproot, short, procumbent barren shoots, and erect flowering stems, 1 to 2 feet high, more or less hoary with short hairs, and usually viscid in the upper part. Lower leaves oblong-obovate, pointed, narrowed into a long stalk, the stem-leaves few, narrow, and sessile. Flowers nodding, in a loose rather narrow panicle, 3 or 5 together on short opposite peduncles. Calyx tubular, 4 or 5 lines long. Petals white, or greenish underneath, deeply 2-cleft, with long claws, the style and stamens projecting beyond the flower.



Fig. 134.

On hilly or stony pastures, and in rocky districts, over nearly the whole of Europe and Russian Asia to the Arctic Circle. Distributed over several parts of England and southern Scotland, but in some places introduced only, and not recorded from Ireland. *Fl.* summer.

5. **Small-flowered Silene.** *Silene gallica*, Linn. (Fig. 135.)

(*S. anglica*, Eng. Bot. t. 1178.)

A hairy, slightly viscid, much branched annual, 6 inches to near a foot high, erect or decumbent at the base. Lower leaves small and obovate, upper ones narrow and pointed. Flowers small, nearly sessile, generally all turned to one side, forming a simple or forked terminal spike, with a linear bract at the base of each flower. Calyx very hairy, with 10 longitudinal ribs and 5 slender teeth, at first tubular, afterwards ovoid, and much contracted at the top. Petals very small, entire or notched, pale red or white.



Fig. 135.

Probably of south European origin, but now a common weed in sandy or gravelly fields and waste places, espe-

cially near the sea, in most parts of the cultivated world; pretty frequent in southern England, and appearing occasionally in other parts of Britain. *Fl. summer*. A variety with a dark spot on the petals, *S. quinquevulnera* (Eng. Bot. t. 86), used to be cultivated in flower-gardens.

6. Striated Silene. *Silene conica*, Linn. (Fig. 136.)

(Eng. Bot. t. 922.)



Fig. 136.

An erect, simple, or slightly branched annual, about 6 inches high, slightly hoary with minute, soft hairs. Radical leaves obovate, spreading, those of the stem narrow and erect. Flowers few, in a small, compact, terminal panicle. Calyx conical, about 6 lines long, marked with 25 to 30 longitudinal veins, the mouth always contracted, with 5 slender teeth. Petals small, pale pink, notched or 2-cleft.

In sandy fields and waste places, especially near the sea, common in central and southern Europe and central Asia, but not reaching into northern Germany. In Britain, confined to south-eastern England and southern Ireland, or appearing occasionally on ballast-hills further north. *Fl. summer*.

7. Night Silene. *Silene noctiflora*, Linn. (Fig. 137.)

(Eng. Bot. t. 291.)

A coarse, erect, hairy, and viscid annual, 1 to 2 feet high, simple or branched. Lower leaves ovate or ovate-lanceolate, and shortly stalked, the upper ones narrow-lanceolate and sessile. Flowers two or three, or sometimes several together, in a loose, terminal, dichotomous panicle. Calyx above an inch long, tubular, with 10 ribs and 5 slender teeth,

swelling, as the fruit ripens, rather below the middle. Petals rather large, 2-cleft, pale pink or nearly white, opening at night.

Probably of south European origin, now a common cornfield weed in central Europe, and found occasionally as such in various parts of England, Ireland, and southern Scotland. *Fl. with the corn.*



Fig. 137.

IV. **LYCHNIS.** LYCHNIS.

Calyx tubular or inflated, with 5 teeth. Petals 5, with erect claws and a spreading lamina, entire or 2-cleft, usually with a small, double or notched scale at its base. Stamens 10. Styles 5, or very rarely 4. Capsule 1-celled, or divided at the base into 5 cells, and opening in 5 or 10 teeth or short valves at the top.

Far less numerous than *Silene*, the species of this genus are however widely spread over the northern hemisphere without the tropics. Some botanists break up the genus into several small ones, referring the British species to *Melandrium*, *Agrostemma*, *Lychnis*, and *Viscaria*.

Calyx with long, narrow, green lobes projecting beyond the

petals 3. *Corn L.*

Calyx-teeth shorter than the petals.

Calyx after flowering much swollen, ovoid and globular.

Plant glabrous and glaucous. Calyx veined *Bladder Silene.*

Plant coarse, green, and hairy. Calyx 10-ribbed.

Flowers white. Capsule ovoid 1. *White L.*

Flowers red. Capsule nearly globular 2. *Red L.*

Calyx tubular or short, not swollen.

Flowers in loose panicles. Petals cut into narrow strips 4. *Meadow L.*

Flowers in heads, or dense oblong panicles.

Stems very viscid. Calyx narrow, tubular. Petals notched 5. *Viscid L.*

Stem not viscid. Calyx short. Petals 2-cleft 6. *Alpine L.*

Among the exotic species most frequently cultivated for ornament,

may be mentioned the *L. chalconica*, *L. coronaria* or *Rose Campion*, *L. Cæli-Rosa*, and *L. ocellata*, from the Mediterranean region or the Levant, and *L. fulgens* from Mexico.

1. **White Lychnis.** *Lychnis vespertina*, Sibth. (Fig. 138.)

(*L. dioica alba*, Eng. Bot. t. 1580.)



Fig. 138.

Asia. Abundant in Britain.

A rather coarse, hairy biennial, more or less viscid, 1 to 2 feet high, and loosely branched. Leaves oval-oblong, usually pointed, tapering at the base, the lower ones stalked. Flowers few, in loose panicles, rather large, white, or rarely pale pink, opening in the evening (when they are slightly scented), and usually dioecious. Calyx 7 to 9 lines long, softly hairy, with 10 ribs and 5 lanceolate-linear teeth, swelling as the capsule ripens, so as to assume an ovoid shape. Petals 2-cleft. Capsule ovoid, opening at the top in 10 teeth, which remain erect, or curve slightly outwards.

Under hedges, in fields and waste places, throughout Europe and Russian

Fl. all summer.

2. **Red Lychnis.** *Lychnis diurna*, Sibth. (Fig. 139.)

(*L. dioica rubra*, Eng. Bot. t. 1579.)



Fig. 139.

Very near the *white L.*, and perhaps a mere variety, but the plant is less viscid, the leaves and calyxes usually shorter, the flowers red, scentless, opening in the morning, and the capsule more globular, the 10 teeth very spreading, or rolled back.

In moist, shady places, woods and hedge-banks, with the same geographical range as the *white L.* Equally common in Britain. *Fl. all summer, commencing in spring.*

3. Corn Lychnis. *Lychnis Githago*, Linn. (Fig. 140.)

(*Agrostemma*, Eng. Bot. t. 741. *Corn Cockle*.)

A tall, erect annual, simple or slightly branched, clothed with long, soft, whitish appressed hairs. Leaves long and narrow. Flowers on long leafless peduncles, rather large, red, and inodorous, remarkable for the long, green, linear lobes of the calyx, projecting much beyond the petals; the latter are broad, undivided, and without any scales on the lamina. Capsule opening in 5 teeth.

Probably of south-eastern origin, but now a common cornfield weed, all over Europe and Russian Asia, except the extreme north. Abundant in British cornfields. *Fl. with the corn.*



Fig. 140.

4. Meadow Lychnis. *Lychnis Flos-cuculi*, Linn. (Fig. 141.)

(Eng. Bot. t. 573. *Ragged Robin*.)

Stock short and perennial, but not of long duration, stems erect, not much branched, 1 to 2 feet high, slightly downy below and viscid above. Leaves few, narrow-lanceolate, the lower ones stalked. Flowers in loose terminal panicles, red and scentless, but remarkable for their petals cut into 4 linear lobes, the two middle ones the longest. Calyx short, glabrous, with 10 ribs and 5 short teeth. Capsule nearly globular, opening in 5 teeth.

In moist or marshy meadows and pastures, ditches, etc., throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. spring and summer.*



Fig. 141.

5. Viscid Lychnis. *Lychnis Viscaria*, Linn. (Fig. 142.)

(Eng. Bot. t. 788.)

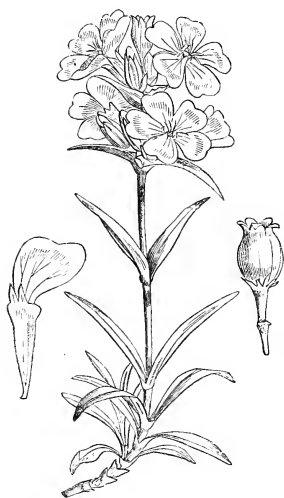


Fig. 142.

Stock perennial, usually tufted, the flowering stems erect, 6 inches to a foot high, glabrous, but very viscid in the upper part. Leaves long and narrow, the lower ones contracted into long stalks, which are often fringed with a few woolly hairs. Flowers red, in close, sessile or shortly-stalked opposite clusters, forming an oblong panicle, or sometimes a terminal head. Calyx tubular, about 6 lines long, with 10 veins and 5 short teeth, rather swollen above the middle as the fruit ripens. Petals slightly notched.

On rocks and rather dry hilly pastures, in northern and central Europe and a great part of Russian Asia, but not an Arctic plant, and yet rare in southern Europe. In Britain confined to a few localities in North Wales and Scotland, especially about Edinburgh and in Perthshire. *Fl.* June.

6. Alpine Lychnis. *Lychnis alpina*, Linn. (Fig. 143.)

(Eng. Bot. t. 2254.)



Fig. 143.

Like the *viscid* *L.* in habit and foliage, but smaller and not viscid. Stems seldom 6 inches high. Flowers pink, smaller than in the *viscid* *L.*, in compact heads, the calyx much shorter, and the petals narrow and deeply 2-cleft.

In rocky situations, at high latitudes or great elevations, in Arctic and northern Europe and Asia, and in the higher mountain ranges of central Europe. In Britain, only known on the summit of Little Kilrannoch, a mountain in Forfarshire, and on Hobcartin Fell, in Cumberland. *Fl.* summer.

V. PEARLWORT. SAGINA.

Small, matted or tufted herbs, with subulate leaves and small flowers. Sepals 4 or 5. Petals 4 or 5, small, entire or slightly notched, sometimes entirely deficient. Stamens 4 or 5, or twice those numbers. Styles 4 or 5. Capsule opening in as many valves.

A small genus, with nearly the geographical range of *Sandwort*, from which it only differs in the number of styles. The 5-styled species were formerly included in *Spurry*, which is now reduced to one or two species easily distinguished by their apparently whorled foliage.

- Sepals, stamens, and styles usually 4. Petals as many,
 or none 1. *Procumbent P.*
 Sepals, petals, and styles 5. Stamens usually 10.
 Sepals obtuse.
 Petals not longer than the calyx. Leaves not clustered 2. *Alpine P.*
 Petals longer than the calyx. Upper leaves with
 clusters of very small ones in their axils . . . 3. *Knotted P.*
 Sepals pointed *Vernal Sandwort.*

1. **Procumbent Pearlwort.** *Sagina procumbens*, Linn.
 (Fig. 144.)

(Eng. Bot. t. 880. *S. apetala*, Eng. Bot. t. 881, and *S. ciliata*,
 Brit. Fl.)

A minute annual, or perhaps perennial, 1 to 2 inches or seldom 3 inches high, sometimes erect from the base, especially at first, but usually branching and decumbent at the base, forming little spreading tufts, usually glabrous, but having often an exceedingly minute glandular down. Leaves small and subulate, jointed at the base in a short, broad, scarious sheath, the radical ones longer and often tufted. Flowers very small, on capillary pedicels much longer than the leaves. Sepals about a line long, and obtuse. Petals much shorter, often wanting. Valves of the capsule as long as, or rather longer than the sepals. All these parts are usually in fours, but they may often be met with in fives.



Fig. 144.

In a great variety of situations, but especially in waste or stony places, wet or dry heaths, sandy marshes, etc., throughout Europe, in Russian and central Asia, North America, Australia, etc. Abundant in Britain. *Fl. from spring till autumn.* It varies considerably, and has been divided into many supposed species. Small, slender, but little-branched specimens, with the petals very minute or wanting, constitute the *S. apetala*; in the *S. ciliata* the branches are more diffuse. A seacoast variety, called *S. maritima* (Eng. Bot. t. 2195), presents the usual maritime differences of somewhat firmer and thicker stems and leaves.

2. Alpine Pearlwort. *Sagina Linnæi*, Presl. (Fig. 145.)

(*Spergula saginoides*, Eng. Bot. t. 2105. *Sagina saxatilis* and *S. subulata*, Brit. Fl.)



Fig. 145.

Very near the *procumbent P.*, but it forms an undoubtedly perennial stock (although often flowering the first year, so as to appear annual), the radical leaves are rather longer, the petals are more conspicuous, usually considerably longer than the sepals, and there are almost always 5 sepals, 5 petals, 10 stamens, and 5 styles and valves of the capsule.

In mountain pastures, and stony places, in Arctic and northern Europe, Asia, and America, and in most mountain districts of central and southern Europe to the Caucasus, descending occasionally to the seacoast in western Europe, when it is very difficult to distinguish it from the *procumbent P.* In Britain, in the Scotch Highlands, in the west and south of England, and in Ireland. *Fl. summer.*

3. Knotted Pearlwort. *Sagina nodosa*, Fenzl. (Fig. 146.)

(*Spergula*, Eng. Bot. t. 694.)

Like the last, this forms little perennial tufts, but as it often flowers the first year, it then appears annual. Stems numerous, decumbent, or nearly erect, 2 to 3 or rarely 4 inches high, and not much branched. Lower leaves like those of the *alpine P.*, or rather longer, but the stem-leaves are much shorter, with little clusters of minute ones in their

axils. Flowers few on each stem, on pedicels from 3 to 6 lines long, and more conspicuous than in the other species, the wide obovate petals being twice as long as the calyx. Sepals obtuse, a line long, the parts of the flower usually in fives, with 10 stamens.

In wet, sandy places, marshes, and bogs, in northern and central Europe, Russian Asia, and northern America. Generally distributed over Britain. *Fl. summer.*



Fig. 146.

VI. **CHERLERIA.** *CHERLERIA.*

Densely tufted, moss-like perennials, with closely packed leaves. Sepals 5. Petals none, or rarely linear and very minute. Stamens 10. Styles and valves of the capsule 3. Flowers usually wholly or partially unisexual.

A genus of one or perhaps two species, scarcely distinct from *Sandwort*.

1. **Mossy Cherleria.** *Cherleria sedoides*, Linn. (Fig. 147.)

(Eng. Bot. t. 1212. *Cyphel*.)

Stock very densely matted, often several inches in diameter, with long roots, the very short branches completely covered with closely packed linear leaves, rather stiff, and 2 or 3 lines long. Pedicels slender, from the summit of the tufts, with a single erect flower. Sepals about a line long, with 3 prominent veins. Stamens shorter than the calyx. Capsule slightly protruding, opening to the base in 3 valves, and containing but few seeds.

An alpine plant, not uncommon at considerable elevations in the Pyrenees and Alps of Europe, extending east-



Fig. 147.

ward to Greece and Transylvania, and reappearing in the Scotch Highlands, especially in the Breadalbane range, and in Sutherland, although neither an Arctic nor a Scandinavian plant. *Fl. summer.*

VII. SANDWORT. ARENARIA.

Small, branched annuals, or tufted or prostrate perennials, glabrous, or rarely shortly hairy, with white flowers. Sepals 5. Petals 5, entire. Stamens 10 or rarely fewer. Styles 3, very rarely 4. Capsule opening in as many or twice as many valves.

A very numerous genus in the northern hemisphere without the tropics, with a few species also in the southern hemisphere; distinguished from *Pearlwort* by the number of styles, from *Cerast* and *Starwort* by the entire petals. The British species are usually distributed into four sections, often considered as independent genera, viz. *Alsine*, with the valves of the capsule as many as the styles, and many seeds, including the *vernal S.*, the *bog S.*, and the *fine-leaved S.*; *Honckeneya*, with the valves of the capsule as many as the styles, and few large seeds, for the *ovate S.*; *Arenaria*, with the capsular valves twice as many and no appendage to the seeds, including the *fringed S.* and the *thyme-leaved S.*; and *Mähringia*, with the capsule of *Arenaria*, but with shining seeds, having a little appendage to their hilum.

Leaves linear or subulate.

Tufted perennials. Petals about as long as or longer than the sepals.

Pedicels 2 to 4 lines long 1. *Vernal S.*

Pedicels 6 lines to an inch long or more 2. *Bog S.*

Annual. Petals about half as long as the sepals . . . 3. *Fine-leaved S.*

Leaves ovate.

Leaves thick and fleshy. Capsules large, globular, 5-valved 4. *Ovate S.*

Leaves small or thin. Capsule 10-valved, small.

Leaves scarcely 2 lines long. Sepals with 3 nerves.

Annual, much branched, and downy. Petals shorter or scarcely longer than the calyx . . . 5. *Thyme-leaved S.*

Alpine, procumbent perennial. Petals much longer than the calyx 6. *Fringed S.*

Leaves mostly half an inch, thin, and 3-nerved.

Sepals 1-nerved 7. *Three-nerved S.*

1. Vernal Sandwort. *Arenaria verna*, Linn. (Fig. 148).

(Eng. Bot. t. 512.)

Stock perennial, short, becoming densely tufted and thickly covered

with old leaves; the flowering stems erect or decumbent, 2 to 4 inches high, and branched. Leaves subulate, rather stiff, the upper ones short and broader. Flowers in rather loose forked cymes, the pedicels usually slightly downy, and seldom above 3 or 4 lines long. Sepals $1\frac{1}{2}$ to near 2 lines long, pointed, with 3 very prominent nerves. Petals obovate, spreading beyond the points of the sepals. Capsule 3-valved.

In stony mountain pastures, almost all over the continent of Europe and Russian Asia and in North America. Much less frequent in Britain, and chiefly in Scotland, northern England, Wales, Cornwall, and Ireland. *Fl. spring and summer*. A high northern and Arctic variety, extending to the higher mountains of Scotland, has been distinguished under the name of *A. rubella*

(Eng. Bot. Suppl. t. 2638). It is more stunted, with shorter and rather broader leaves, few flowers, smaller and narrower petals, and sometimes 4 or even 5 styles and capsular valves.

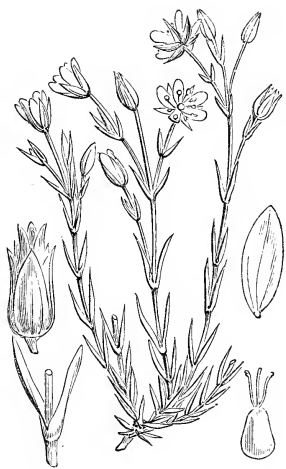


Fig. 148.

2. Bog Sandwort. *Arenaria uliginosa*, Schleich. (Fig. 149.)
(Eng. Bot. Suppl. t. 2890.)

Perennial tufts like those of the *vernal S.*, but the subulate leaves are rather thicker, almost succulent, the stems longer, with very few distant pairs of leaves, the pedicels much longer, often an inch or even more, and always glabrous, the sepals broader. Petals about the length of the calyx. Capsule 3-valved.

In bogs or mountain marshes, in Arctic and northern Europe and Asia, and in some mountainous parts of central Europe, but never common. In Britain, only known on Widdybank Fell, in Durham. *Fl. summer*.



Fig. 149.

3. Fine-leaved Sandwort. *Arenaria tenuifolia*, Linn.

(Fig. 150.)

(Eng. Bot. t. 219.)



Fig. 150.

A very slender, erect, much branched annual, glabrous or very minutely downy, 3 or 4 inches high. Leaves finely subulate. Pedicels very slender, usually about half an inch long. Sepals narrow-lanceolate, finely pointed. Petals ob-ovate or oblong, usually scarcely half the length of the sepals. Capsule opening in 3 valves.

On old walls, stony wastes, or sandy fields, in central and southern Europe, from southern Sweden to the Caucasus. In Britain, apparently confined to some of the eastern counties of England. *Fl. summer.*

4. Ovate Sandwort. *Arenaria peploides*, Linn. (Fig. 151.)

(Eng. Bot. t. 189; *Honckeneya*, Brit. Fl. *Sea Purslane*.)



Fig. 151.

Rootstock creeping, with short, procumbent, usually forked flower-stems. Leaves numerous, thick and somewhat fleshy, ovate or elliptical, half an inch long or more, the upper ones smaller and broader. Flowers few, on short pedicels, in small, leafy terminal cymes, usually more or less unisexual. Sepals thickish, about $2\frac{1}{2}$ lines long. Petals scarcely longer. Capsule large, nearly globular, opening in 3 (or sometimes 4 or 5) broad valves, with fewer and larger seeds than in the other *Sandworts*.

In maritime sands, in northern and Arctic Europe, Asia, and America, extending down western Europe to Portugal. Rather common all round Britain. *Fl. summer, rather early.*

5. **Thyme-leaved Sandwort.** *Arenaria serpyllifolia*, Linn.
(Fig. 152.)

(Eng. Bot. t. 923.)

A very much branched, slender, and slightly downy annual, seldom attaining 6 inches. Leaves very small, ovate and pointed. Pedicels from the upper axils or forks of the stem, 2 or 3 lines long, and slender. Sepals pointed, about $1\frac{1}{2}$ lines long. Petals usually much shorter, but variable in size, obovate. Capsule opening in 6 short narrow valves.

On walls and dry sands, or stony, waste places, throughout Europe and central and Russian Asia, except the extreme north. Common in Britain, but more so in the south than in the north. *Fl. summer.*



Fig. 152.

6. **Fringed Sandwort.** *Arenaria ciliata*, Linn. (Fig. 153.)

(Eng. Bot. t. 1745.)

Stems perennial at the base, short, diffuse, generally much branched and matted, the flowering branches 2 or 3 inches high, and more or less downy. Leaves small and ovate, more distinctly stalked than in the *thyme-leaved S.*, veined underneath, and usually fringed with a few stiff hairs on each edge near the base. Flowers much larger than in the last species, on slender pedicels, 3 to 6 lines long, the obovate petals considerably longer than the sepals. Capsule opening in 6 valves.

In mountain pastures, in northern and Arctic Europe, and at considerable elevations, in the higher ranges of central and southern Europe. In Britain, only



Fig. 153.

on limestone cliffs near Ben Bulbin, in Sligo, Ireland, and on a serpentine hill in Unst, Shetland. *Fl. summer.* The Shetland specimens belong to an Arctic (maritime?) variety, with more succulent leaves, seldom fringed, and rather broader sepals, distinguished as a species under the name of *A. norvegica* (Eng. Bot. Suppl. t. 2852).

7. Three-nerved Sandwort. *Arenaria trinervis*, Linn.

(Fig. 154.)

(Eng. Bot. t. 1483.)



Fig. 154.

A tender, much branched, decumbent or spreading annual, from 4 or 5 inches to a foot long, resembling in some respects the *Chickweed Starwort*, but very different in flower. Leaves stalked, ovate, pointed, half an inch long or more, thin, of a light green, with 3 distinct nerves. Pedicels from the upper forks of the stem, rather longer than the leaves. Sepals very pointed. Petals not quite so long, obovate and entire. Capsule opening in 6 valves, the seeds few, shining, with a little white appendage at their hilum.

In shady woods, along ditches and moist places, throughout Europe and the greater part of Russian Asia, except the extreme north. Frequent in England and Ireland, less so in Scotland. *Fl. spring and summer.*

VIII. **M**ÆNCHIA. MÆNCHIA.

Small, but rather stiff, erect annuals. Sepals 4. Petals 4, entire. Stamens 4 or 8. Styles 4. Capsule opening at the top, with 8 short teeth.

A genus of two or three European species, with the numbers of parts of the flower and entire petals of *Pearlwort*, the habit and calyx rather of *Starwort*, and the capsule of a *Cerast*.

1. Upright *Mœnchia*. *Mœnchia erecta*, Sm. (Fig. 155.)

(Sagina, Eng. Bot. t. 609.)

A glabrous and glaucous annual, 2 to 4 or rarely 6 inches high. Leaves linear, the radical ones slightly spatulate and stalked, the upper ones few and sessile. Flowers few, white, rather large for the size of the plant, on long, erect pedicels. Sepals nearly 3 lines long, broadly lanceolate, pointed, with white scarious margins. Petals rather shorter. Capsule ovate.

In stony or sandy wastes and pastures, over the greater part of central and southern Europe, but not extending to its eastern limits, nor into the north of Germany. Spread over England as far north as Cheshire and Durham, not recorded from Ireland. *Fl. spring or early summer.*



Fig. 155.

IX. **HOLOSTEUM.** HOLOSTEUM.

Small annuals. Sepals 5. Petals 5, more or less toothed or jagged, but not cleft. Stamens usually 5. Styles 3. Capsule opening in 6 short valves or teeth.

Besides our species, there are but one or two from the Levant, all differing from *Cerast* in the less divided petals, and generally fewer stamens and styles.

1. Umbellate *Holosteum*. *Holosteum umbellatum*, Linn.

(Fig. 156.)

(Eng. Bot. t. 27.)

A slightly downy, more or less viscid annual, seldom above 6 inches high, divided at the base into several erect or ascending stems. Radical leaves spreading, oblong or elliptical; those of the stem sessile, varying from ovate to linear, often half an inch long, or more. The upper part of the stem forms an almost leafless peduncle, bearing an umbel of 3 to 8 flowers, on long pedicels, erect at the time of flowering, then turned

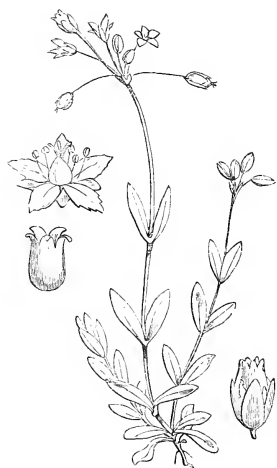


Fig. 156.

down, and erect again when the capsule is ripe. Sepals near 2 lines long, white and scarious at the edges. Petals white, rather longer.

On sandy and stony wastes, fields, and roadsides, very common in southern Europe and western Asia, extending more sparingly over central Europe to southern Sweden. In Britain, only in Norfolk and Suffolk.

X. CERAST. CERASTIUM.

Annual or perennial herbs, usually downy or hairy, and branching at the base, with white flowers in terminal forked cymes, or rarely solitary; the upper bracts often, like the sepals, scarious on the edges. Sepals 5, rarely 4. Petals 5, rarely 4, usually 2-cleft, sometimes minute or wanting. Stamens 10, or occasionally reduced to 5 or fewer. Styles 5, rarely 4 or 3. Capsule opening at the top in twice as many short teeth as there are styles.

A considerable genus, widely diffused over the whole range of the family, and rather a natural one, differing generally from *Starwort* in its capsule, from the other British *Alsineæ* by the cleft petals.

Annual or biennial. Petals shorter, or scarcely longer than the calyx 1. *Common C.*

Perennials. Petals considerably longer than the calyx.

Styles always 5.

Leaves narrow, pointed 2. *Field C.*

Leaves oblong or ovate, and obtuse 3. *Alpine C.*

Styles mostly 3. Leaves narrow 4. *Starwort C.*

An eastern species, with cottony leaves, *C. tomentosum*, is not unfrequently cultivated in our cottage gardens.

1. Common Cerast. *Cerastium vulgatum*, Linn. (Fig. 157.)(Eng. Bot. t. 789. *Mouse-ear Chickweed*.)

A coarsely downy, usually more or less viscid annual, branching at the base, sometimes dwarf, erect, and much branched; at others, loosely ascending to a foot or even two, occasionally forming, at the end of the season, dense, matted tufts, which may live through the winter, and give it the appearance of a perennial. Radical leaves small and stalked; stem-leaves sessile, from broadly ovate to narrow-oblong. Sepals 2 to $2\frac{1}{2}$ lines long, green, and downy, but with more or less conspicuous scarious margins. Petals seldom exceeding the calyx, and often much shorter, sometimes very minute, or even none. Stamens often reduced to 5 or fewer. Capsule, when ripe, cylindrical, often curved, and projecting beyond the calyx.

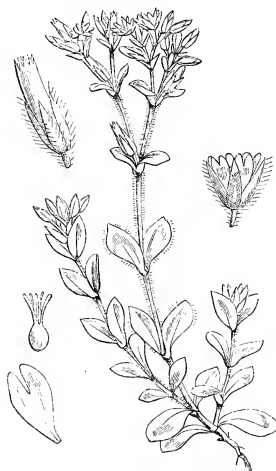


Fig. 157.

In cultivated and waste places, pastures, and woods, wet or dry, over nearly the whole of the civilized world. Most abundant in Britain. *Fl. the whole season*. Its protean forms have much puzzled the botanists of many countries to distinguish them into from 2 or 3 to 20 or 30 supposed species. The most conspicuous observable in Britain are—

a. *Clustered C.* (*C. glomeratum*). Tall and luxuriant, the leaves broad, almost orbicular, the flowers in a compact head, the pedicels shorter than the calyx, the stamens usually 10. In rich soils, in moist, shady situations, but often, later in the season, assuming the inflorescence of the narrower-leaved varieties.

b. *Narrow-leaved C.* (*C. viscosum*, Eng. Bot. t. 790). Much branched at the base, but usually rather tall. Leaves oblong or narrow. Stamens usually 10. The commonest form in rather moist and rich meadows and pastures. Pedicels often elongated in this and the 2 following varieties.

c. *Lesser C.* (*C. semidecandrum*, Eng. Bot. t. 1630. *C. pumilum*, Bab. Man.). Stems short and often slender, more branched and more erect as the situation is drier. Leaves rather small, thicker near the sea, more viscid in hot situations. Stamens usually about 5, but often more. Capsules usually long. Very common in dry, poor, open situations.

d. *Four-stamened C.* (*C. tetrandrum*). Like the last, but more branched, and the parts of the flower usually reduced to fours. Pedicels often long. Less common than the last two, and generally near the sea.

2. Field Cerast. *Cerastium arvense*, Linn. (Fig. 158.)

(Eng. Bot. t. 93.)



Fig. 158.

Stem perennial, and much branched at the base, often very intricate and prostrate; the flowering branches ascending to about 6 inches, or more when very luxuriant. Leaves crowded in the lower parts, narrow, lanceolate-linear, more glabrous and less viscid than in the common *C.* Flowers large and white, in loose cymes, on rather long pedicels. Sepals near 3 lines long. Petals twice that length, cleft to near the middle. Capsule oblique, usually longer than the calyx.

In dry, hilly fields, pastures, and banks, throughout Europe and Russian Asia, except the extreme north, in North America, and down the Andes of South America. In numerous localities in Britain, but not at all common. *Fl. spring and early summer.*

3. Alpine Cerast. *Cerastium alpinum*, Linn. (Fig. 159.)

(Eng. Bot. t. 472; and *C. latifolium*, Eng. Bot. t. 473.)

Stems shortly perennial, much branched, prostrate, and rooting at the base; the flowering branches ascending to a few inches, with one or two large flowers on long peduncles: the whole plant nearly glabrous, or more frequently covered with long woolly hairs, and occasionally viscid. Leaves ovate, elliptical, or oblong, always broader for their length than in the *field C.* Petals rather longer than in that species. Capsule not much longer than the calyx, straight or nearly so.

In alpine, moist pastures, and wet, rocky situations, in all the great mountain-ranges of Europe and Russian Asia, and all round the Arctic Circle. Pretty abundant in the Highlands of Scotland, less so in northern England, and rare in Wales; not recorded from Ireland. *Fl. summer.* The nearly glabrous form, figured Eng. Bot. t. 472, which

is the *C. alpinum* of most Continental botanists, is not so common in Britain as the woolly one figured as *C. latifolium*, Eng. Bot. t. 473, which is the *C. lanatum* of some foreign botanists. The *C. latifolium* of the Alps of central Europe is not a British plant.

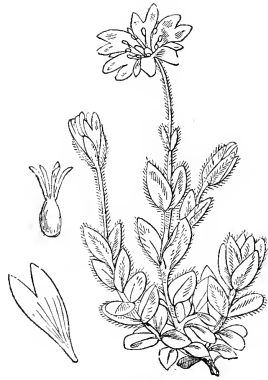


Fig. 159.

4. Starwort Cerast. *Cerastium trigynum*, Vill. (Fig. 160.)

(*Stellaria cerastoides*, Eng. Bot. t. 911.)

Stems shortly perennial, prostrate and intricately branched, but much more slender than in the *alpine C.*; the whole plant glabrous, with the exception of minute hairs down one side of the branches, or rarely generally hairy. Leaves narrow, and usually curved to one side. Flowering branches shortly ascending, with one or two large flowers, on rather long peduncles, like those of the *alpine C.*; but the styles are almost always reduced to 3, or very rarely flowers may be found with 4 or even 5, the teeth of the capsule always double the number of the styles.



Fig. 160.

In moist, alpine situations, in all the great mountain-ranges of Europe and Russian Asia to the Arctic Circle. Not unfrequent in the Breadalbane range in Scotland, and other mountains to the northward; recorded also from near Bantry, in Ireland. *Fl. summer.*

XI. STARWORT. STELLARIA.

Annuals or perennials, generally more glabrous than the *Cerasts*, the

leaves usually pointed, and often cordate, the sepals more pointed and less distinctly scarious at the edge. Sepals 5. Petals 5, deeply bifid. Stamens 10, occasionally reduced to 5 or fewer. Styles 3, or rarely 5. Capsule opening to the middle or lower down, in as many or twice as many valves.

A large genus, extending, like the *Cerasts*, over nearly the whole geographical range of the family, and generally a natural one, although some species, especially the *Chickweed* and *Bog Starworts*, have all the appearance of the *three-nerved Sandwort*, and can only be distinguished by a close inspection of the minute petals and capsules. Most species of *Starwort* may be met with occasionally, though rarely, without any petals at all.

Lower leaves stalked, ovate or heart-shaped.

Petals much longer than the calyx.

Five styles in most of the flowers 1. *Water S.*

Three styles 2. *Wood S.*

Petals shorter, or scarcely longer than the calyx.

Lower leaves ovate-cordate, on long stalks 3. *Chickweed S.*

All the leaves narrowed at the base, sessile or shortly stalked 4. *Bog S.*

All the leaves narrow-lanceolate or linear, and sessile or nearly so.

Petals shorter, or scarcely longer than the calyx.

Plant annual. Leaves oblong or lanceolate, short . . . 4. *Bog S.*

Stock perennial. Leaves narrow-lanceolate or linear . . 5. *Lesser S.*

Petals considerably longer than the calyx.

Leaves very narrow. Sepals distinctly three-nerved . . 6. *Glaucous S.*

Leaves lanceolate or linear-lanceolate. Nerves of the sepals scarcely perceptible 7. *Greater S.*

1. Water Starwort. *Stellaria aquatica*, Scop. (Fig. 161.)

(*Cerastium*, Eng. Bot. t. 538. *Malachium*, Brit. Fl.)

A perennial with much of the habit and the heart-shaped leaves of the *wood S.*, but on a rather larger scale, usually more pubescent, and slightly viscid, the flowers smaller, and always known by all or most of the flowers having 5 styles, and the capsule opening in 5 valves, which are entire or shortly bifid, seldom deeply cleft as in the other *Starworts*. Stems weak, often a foot or more in length. Lower leaves small, on long stalks, upper ones more sessile or stem-clasping, often 1 to 2 inches long, thin and flaccid, with a prominent midrib, and very pointed. Flowers in the forks of leafy cymes, the pedicels turned down after flowering. Sepals about 2 lines long at the time of flowering, enlarged

when in fruit. Petals narrow, deeply cleft, about one-half longer than the calyx.

In wet places, along ditches and streams, etc., very widely diffused over Europe and Russian and central Asia, except the extreme north, and migrating with man to several other parts of the world. Not common in Britain, although found in most English counties, as far north as Yorkshire and Cheshire, and believed to have been found in Ireland. *Fl. summer.* The flowers have occasionally, but seldom, only 3 styles.

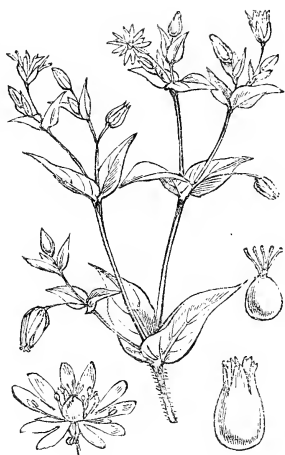


Fig. 161.

2. Wood Starwort. *Stellaria nemorum*, Linn. (Fig. 162.)

(Eng. Bot. t. 92.)

Rootstock creeping, of some years' duration. Stems weak, emitting creeping branches from the base, the flowering branches ascending to 6 inches or a foot, with a few short, spreading hairs. Leaves heart-shaped, pointed, of a thin texture, usually glabrous or slightly ciliated on the edges, the lower ones small, on long stalks, the upper 1 to 2 inches long, with much shorter stalks or nearly sessile. Flowers in elegant, loose, spreading cymes, on long, slender pedicels, with small bracts at their base. Sepals about 3 lines, the petals nearly twice as long, narrow, and deeply cleft. Styles 3. Capsule straight, opening to near the base into 3 bifid or 6 entire valves.

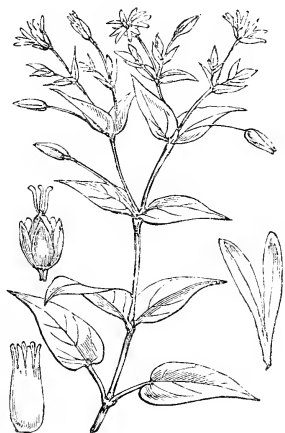


Fig. 162.

In moist woods, throughout northern Europe and the hilly districts of central, and some parts of southern Europe, and across Russian Asia to western North America. In Britain, chiefly in northern and western England and southern Scotland. Not recorded from Ireland. *Fl. summer.*

3. Chickweed Starwort. *Stellaria media*, Linn. (Fig. 163.)

(Eng. Bot. t. 537. *Chickweed*.)



Fig. 163.

A weak, much branched annual, glabrous, with the exception of a line of hairs down one side of the stem, and a few long ones on the leafstalks. Leaves small, ovate and pointed, the lower ones stalked and often heart-shaped, the upper sessile and narrower. Flowers small, on rather long, slender pedicels, in irregularly forked, leafy cymes. Petals shorter than the calyx, deeply cleft, with narrow, slightly diverging lobes. Stamens often reduced to 5. Styles 3.

In cultivated and waste places, roadsides, and edges of streams, throughout Europe, and Russian and central Asia, and carried out as a weed to the whole of the temperate and colder regions of the globe. Abundant in Britain. *Fl. the whole season.*

4. Bog Starwort. *Stellaria uliginosa*, Murr. (Fig. 164.)

(Eng. Bot. t. 1074.)



Fig. 164.

A weak, slender, glabrous annual, in some measure intermediate between the *Chickweed S.* and the *lesser S.* Stems usually about 6 inches, rarely nearly a foot long, much shorter and tufted when on dry ground. Leaves much narrower than in the *Chickweed S.*, but much shorter and broader than in the *lesser S.*, oblong or lanceolate. Flowers small, in loose, slender, forked panicles, which, as in the *lesser S.*, soon become lateral. Sepals about $1\frac{1}{2}$ lines long. Petals shorter, with very narrow spreading lobes. Styles 3.

In marshes and wet ditches, widely spread over Europe, Russian Asia, and northern America, but not an Arctic plant, although in southern Europe generally confined to mountains. Almost universal in Britain. *Fl. spring and summer.*

5. **Lesser Starwort.** *Stellaria graminea*, Linn. (Fig. 165.)

(Eng. Bot. t. 803. *Lesser Stitchwort*.)

A glabrous perennial, with a creeping rootstock and slender quadrangular stems, diffuse or nearly erect, often above a foot long. Leaves sessile, linear-lanceolate and pointed. Flowers small, in long, loose panicles, which often become lateral as the flowering advances, the bracts small and scarious. Sepals 3-ribbed. Petals narrow, deeply cleft, seldom exceeding the calyx.

In meadows and pastures, along hedges, throughout Europe and Russian Asia. Very common in the low grounds of Britain, and up the mountain valleys as far as cultivation extends. *Fl. all summer*.



Fig. 165.

6. **Glaucous Starwort.** *Stellaria glauca*, With. (Fig. 166.)

(Eng. Bot. t. 825.)

Intermediate between the *lesser* and the *great Starworts*, having the 3-ribbed sepals and deeply cleft petals of the former, whilst the flowers are nearly as large as in the latter. It differs also in some measure from both, in being generally of a more glaucous colour, and the leaves are more regularly linear, not so lanceolate nor so pointed. The flowers are also fewer than in the *lesser S.* with the bracts more leafy.

In marshy and wet places, generally diffused over temperate Europe and Russian Asia, but not always well distinguished from the *lesser S.*; it occurs also in Australia. Not very common in Britain, but recorded from several parts of England, Ireland, and southern Scotland. *Fl. summer*.



Fig. 166.

7. Great Starwort. *Stellaria Holostea*, Linn. (Fig. 167.)(Eng. Bot. t. 511. *Stitchwort*.)

Fig. 167.

A perennial, usually glabrous, with a creeping rootstock, and nearly erect though weak stems, 1 to 2 feet high, quadrangular, rather brittle, and sometimes slightly downy. Leaves sessile, lanceolate, tapering to a fine point, often 2 inches long or more. Flowers large, in loose, terminal, forked panicles, with leafy, green bracts. Sepals about 3 lines long, scarious at the edge, scarcely ribbed. Petals near twice as long, rather broad, and cleft to about the middle.

In hedges, open woods, and bushy places, throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. spring and early summer*.

XII. **SANDSPURRY.** SPERGULARIA.

Low, generally prostrate herbs, with opposite, linear or subulate leaves, with smaller ones often clustered in their axils, and scaly, scarious stipules. Sepals 5. Petals 5, undivided. Stamens 10 or occasionally fewer. Styles 3, rarely 4 or 5. Capsule opening in as many entire valves.

A genus of very few, chiefly Mediterranean species, differing from *Sandwort* only in the stipules, which give them a strong resemblance to the *Paronychia* family.

1. Common Sandspurry. *Spergularia rubra*, Pers. (Fig. 168.)(Arenaria, Eng. Bot. t. 852, and *A. marina*, Eng. Bot. t. 958.*Lepigonum*, Bab. Man.)

An annual or biennial, glabrous or with a short viscid down in the upper parts, with numerous stems branching from the base, and forming spreading or prostrate tufts, 3 or 4 inches, or, when very luxuriant, 6 inches long. Leaves narrow-linear; the scarious stipules at the base

short, but very conspicuous. Flowers very variable in size, usually pink, or rarely nearly white, on short pedicels, in forked cymes, usually leafy at the base. Petals shorter, or rarely rather longer than the sepals. Seeds more or less flattened, often surrounded by a narrow, scarious wing or border.



Fig. 168.

In sandy or gravelly heaths and waste places, chiefly in maritime countries, widely spread over Europe, Russian Asia, North America, and many parts of the southern hemisphere. Common in Britain. *Fl. all summer*. There are two marked varieties, one chiefly occurring inland, has slender leaves, small flowers (the sepals 1 to 2 lines long), short capsules, and the seeds rarely bordered; the other generally growing near the sea, often distinguished as a species, under the name of *S. marina*, has thicker, some what fleshy leaves, larger flowers (the sepals 2 to 3 lines long), larger capsules, and the seeds usually bordered, but both varieties occur with bordered and with unbordered seeds.

XIII. **SPURRY.** SPERGULA.

Slender herbs, with narrow-linear leaves in opposite clusters, so as to appear whorled, and minute, scarious stipules. Sepals 5. Petals 5, undivided. Stamens 10, or occasionally 5 or fewer. Styles 5. Capsule opening in 5 entire valves.

A very small European and Asiatic genus, differing from *Pearlwort*, as *Sandspurry* does from *Sandwort*, by the presence of scarious stipules.

1. **Corn Spurry.** *Spergula arvensis*, Linn. (Fig. 169.)

(Eng. Bot. t. 1535; and *S. pentandria*, Eng. Bot. t. 1536.)

A slender annual, branching at the base into several erect or ascending stems, 6 inches to a foot high, glabrous or slightly downy. Leaves almost subulate, 1 to 2 inches long, growing 6 or 8 together, in two opposite clusters, and spreading, so as to appear whorled. The scarious stipules much smaller than in *Sandspurry*, and sometimes rather difficult to see. Flowers small, white, on long slender pedicels, turned down after flowering, in terminal, forked cymes. Sepals $1\frac{1}{2}$ to 2 lines long. Petals generally shorter. Stamens frequently 10 or 5 in dif-

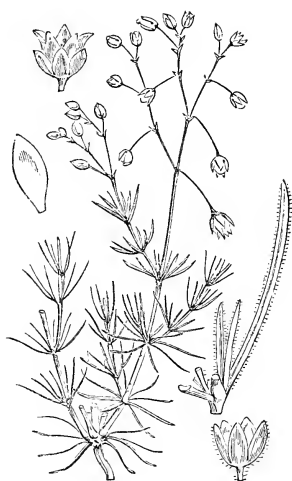


Fig. 169.

ferent flowers of the same plant. Seeds slightly flattened, with or without a narrow, scarious border.

In cultivated and waste places, widely spread over Europe, and Russian and central Asia; but in the northern districts, as in many other parts of the world, only as a cornfield weed. Common in British cornfields. *Fl. all summer.*

XIV. **POLYCARP.** POLYCARPON.

Low annuals, with opposite, or apparently whorled, flat leaves, and scarious stipules. Sepals 5. Petals 5, very minute. Stamens 3 to 5. Style very short, with 3 short linear branches.

A genus of two or three Mediterranean species, very near to *Sand-spurry*, but in their minute petals and very short styles, combined at the base, showing a further approach to the *Paronychia* family.

1. **Four-leaved Polycarp.** *Polycarpon tetraphyllum*, Linn. (Fig. 170.)

(Eng. Bot. t. 1031.)

A glabrous, much branched, spreading or prostrate annual, seldom more than 3 or 4 inches long. Leaves obovate or oblong, really opposite, but placed, as they usually are, under the forks, two pairs are so close together as to assume the appearance of a whorl of 4. Flowers very small and numerous, in loose, terminal cymes; the sepals barely a line long, and rather concave. Petals much shorter, and very thin. Stamens usually 3.

In sandy situations, generally not far from the sea, in west Africa, south-western Europe, round the Mediterranean and along the Atlantic, and spread as an introduced weed over other parts of the world, perhaps indigenous in Australia. In Britain only in the Channel Islands and southern England. *Fl. summer.*

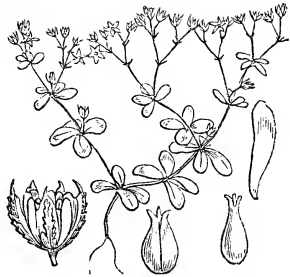


Fig. 170.

XIII. THE PURSLANE FAMILY. PORTULACÆ.

More or less succulent herbs, with entire leaves, usually opposite. Sepals 2 or rarely 3. Petals 5 or rarely more, sometimes slightly united. Stamens either equal in number and opposite to the petals, or indefinite. Styles 2 to 8, united at the base. Capsule 1-celled, with a free central placenta, and several seeds, as in the *Pink* family.

The family has a very wide geographical range, especially in North and South America, with a few species dispersed over the other quarters of the globe. It is nearly allied to the smaller plants of the *Pink* family, and to the *Paronychia* family, but easily known by the calyx. Several species belonging to the exotic genera *Purslane* and *Celandrinea*, as well as to *Claytonia*, are cultivated in our gardens.

Petals 5, distinct. Stamens 5, opposite the petals 1. *Claytonia*.
 Petals united in a corolla split open at one side. Stamens 3 2. *Montia*.

I. CLAYTONIA. CLAYTONIA.

Petals 5, free. Stamens 5, opposite to the petals and adhering to them at the base. Stigmas 3. Capsule opening in 3 valves and containing 3 seeds. The genus comprises several species, natives of north America or northern Asia, and is only admissible into the British Flora amongst naturalized aliens.

1. **Perfoliate Claytonia.** *Claytonia perfoliata*, Don.

(Fig. 171.)

(Bot. Mag. t. 1336.)



Fig. 171.

A glabrous, green, somewhat succulent annual, with numerous spreading prostrate or ascending stems, from a few inches to nearly a foot long. Radical leaves on long petioles, small, broadly ovate or almost reniform. Flowering stems with a single leaf below the flowers, nearly orbicular, concave and quite perfoliate, the stem passing through the centre, evidently formed by the union of two opposite leaves. Flowers very small, in one, two, or more clusters or short racemes along one common peduncle above the leaf. Petals white, notched, scarcely longer than the calyx.

A native of north-western America, now so common a weed in some parts of Lancashire, Oxfordshire, Surrey, and some other English counties that it can be no longer omitted from our Floras. *Fl. spring and summer.*

II. **MONTIA.** MONTIA.

Flowers minute, with the 5 petals united into one corolla, split open in front. Stamens 3. Stigmas 3. Capsule opening in 3 valves, and containing 3 seeds.

The genus consists but of one species.

1. **Water Montia.** *Montia fontana*, Linn. (Fig. 172.)(Eng. Bot. t. 1206. *Blinks* or *Water Chickweed*.)

A little, glabrous, green, somewhat succulent annual, forming dense tufts, from 1 to 4 or 5 inches in height, the stems becoming longer and weaker in more watery situations. Leaves opposite or nearly so, obovate or spatulate, from 3 to 5 or 6 lines long. Flowers solitary or in little drooping racemes of 2 or 3, in the axils of the upper leaves; the petals of a pure white, but very little longer than the calyx. Capsules small and globular.

On the edges of rills, and springy wet places, where the water is not stagnant, throughout Europe, in north Russian Asia, in North America, and down the Andes to the southern extremity. In Australia and New Zealand, but not in central Asia. Extends over the whole of Britain. *Fl. spring and summer.*



Fig. 172.

XIV. THE TAMARISC FAMILY. TAMARISCINEÆ.

A very small European, North African, and central Asiatic family, with one Mexican genus, all differing from the *Pink* family in their frequently shrubby habit, alternate leaves, and the ovules and seeds inserted on 3 distinct placentas, arising from the base of the cavity of the ovary, and adhering sometimes to the sides, forming incomplete dissepiments, almost as in the *Frankenia* family. A single species only has any claims for admission into a British Flora, and that only as an introduced plant, and no others are likely to be met with in our gardens.

I. TAMARISC. TAMARIX.

Maritime shrubs, with slender, twiggy branches, covered with small, green, alternate, scale-like leaves; the flowers small, in terminal spikes or racemes. Sepals 4 or 5. Petals as many. Stamens as many, or twice as many, hypogynous. Ovary free, with 3, rarely 2 or 4 styles. Capsule 1-celled, opening in as many valves as styles. Seeds several, erect, crowned each with a tuft of cottony hairs. No albumen.

1. Common Tamarisc. *Tamarix gallica*, Linn. (Fig. 173.)

(Eng. Bot. t. 1318. *T. anglica*, Brit. Fl.)

An elegant shrub of 3 to 5 or 6 feet; the slender branches erect, or slightly pendulous at the extremities; the numerous scale-like, pointed leaves scarcely above a line long; flowers pink or white, very small, crowded in spikes of from $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, forming frequently branching terminal panicles, the petals persisting till the fruit ripens.



Fig. 173.

Very common on the sandy or marshy seacoasts of the Mediterranean, and extending up the Atlantic shores of Spain and France. Now found on several parts of the southern coast of England, and apparently established there, but believed to be only where it has been planted. *Fl. early summer.*

XV. THE ELATINE FAMILY. ELATINACEÆ.

A very small family, confined in Europe to the single genus *Elatine*, but comprising two or three others from hotter or tropical climates. They differ from the tribe *Alsineæ*, of the *Pink* family, in their capitate stigmas, and their ovaries and capsules completely divided into 3 or more cells.

I. **ELATINE.** ELATINE.

Minute, glabrous, aquatic or marsh annuals, with opposite, entire leaves, minute, almost microscopical stipules, and very small, axillary, solitary flowers. Sepals 3 to 5, sometimes united at the base. Petals as many, hypogynous, entire. Stamens as many, or twice as many. Styles 3 to 5, with capitate stigmas. Ovary and capsule divided into as many cells as styles, opening, when ripe, in as many valves, leaving the dissepiments adhering to the axis. Seeds several.

A small genus, spread over the northern hemisphere, in the new as well as the old world.

Flowers stalked. Petals 3. Stamens 6. Styles 3 . . 1. *Six-stamened E.*
Flowers sessile. Petals 4. Stamens 8. Styles 4 . . 2. *Eight-stamened E.*

1. **Six-Stamened Elatine.** *Elatine hexandra*, DC. (Fig. 174.)

(*E. Hydropiper*, Eng. Bot. t. 955. *Waterpepper*.)

This little plant forms small, matted, creeping tufts, often under water; the stems seldom above 2 inches long, and often not half an inch. Leaves small, obovate or oblong, tapering at the base. Pedicels 1 to 2 lines long. Flowers globular, with 3 rose-coloured petals scarcely longer than the calyx. Seeds numerous, beautifully ribbed and transversely striated under the microscope.

Spread over a wide range, in Europe and Russian Asia, but its known stations always few and scattered. In Britain, recorded from several parts of England, Scotland, and Ireland, and probably frequently overlooked from its minuteness. *Fl. summer*.



Fig. 174.

2. **Eight-stamened Elatine.** *Elatine Hydropiper*, Linn. (Fig. 175.)

(Eng. Bot. Suppl. t. 2670.)

Included by the older authors with the last, under the name of *E. Hydropiper*, but differs in having sessile flowers, with 4 sepals, petals, and styles, and 8 stamens, a more deeply divided calyx, and fewer and larger seeds.

Scattered over the range of the six-stamened *E.*, and sometimes mixed with it, but more rare. In Britain it has only been observed near Farnham in Surrey, and in Anglesea. *Fl. summer*.

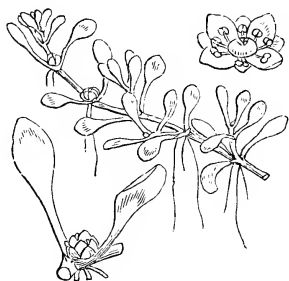


Fig. 175.

XVI. THE HYPERICUM FAMILY. HYPERICINEÆ.

A family confined in Britain to the single genus *Hypericum*. The tropical genera associated with it differ slightly in the number of parts, or in the arrangement of the stamens or of the seeds,

and some are tall shrubs or even trees. The chief distinction of the Order from those nearest allied to it, lies in the stamens, either very numerous or arranged in 3 or 5 clusters or bundles.

I. **HYPERICUM.** HYPERICUM.

Herbs, usually perennial (in some exotic species shrubs), often marked with glandular dots; the leaves opposite and entire, and no stipules; the flowers regular, usually yellow. Sepals 5. Petals 5, hypogynous, usually oblique. Stamens indefinite, clustered or shortly united at the base into 3 or 5 bundles. Capsule more or less completely divided into 3 or 5 cells by as many placentas projecting from the sides to the axis, and usually opening in 3 or 5 valves. Seeds numerous, small, without albumen.

An extensive genus, particularly abundant in southern Europe, western Asia, and North America, but represented also within the tropics, as well as in the southern hemisphere, both in the new and the old world. The glandular dots are of two kinds, the pellucid ones, which can be easily seen by holding up the leaves against the light, and the black ones, which are usually on the under side of the leaves round the edge, or on the flowers themselves.

Undershrubs, with large ovate leaves, few flowers,
broad, round sepals, and stamens in 5 bundles.

Styles 5. Flowers very large 1. *Large-flowered H.*

Styles 3. Petals not much longer than the calyx 2. *Tutsan H.*

Herbs with numerous flowers, small or narrow sepals,
and stamens in 3 bundles or clusters.

*Sepals quite entire, or with very few teeth, without
black dots.*

Stems erect, above a foot high, bearing a corymb
of bright yellow flowers.

Stems cylindrical or slightly angled.

Sepals pointed. Leaves with numerous
pellucid dots 3. *Common H.*

Sepals blunt. Leaves with few or no pellucid
dots 4. *Imperforate H.*

Stems distinctly four-sided.

Sepals broad and blunt, or scarcely pointed 4. *Imperforate H.*

Sepals narrow and very pointed. Petals
pale yellow 5. *Square-stalked H.*

Stems diffuse, not 6 inches long, and much
branched. Flowers small, in leafy cymes 6. *Trailing H.*

*Sepals fringed with black or red glandular teeth or
dots.*

Whole plant perfectly glabrous.

Stems diffuse, or, if erect, growing in tufts, seldom above 6 inches high.

Leaves oblong or ovate. Stems low or diffuse 6. *Trailing H.*

Leaves linear 7. *Flax-leaved H.*

Stems erect and stiff, usually a foot or more high.

Stem-leaves broad-cordate, rarely above $\frac{1}{2}$ -in. long. Panicle oblong, loose 8. *Slender H.*

Stem-leaves ovate or oblong 1 to 2 in. long.

Panicle compact 10. *Mountain H.*

Stems or leaves hairy.

Stem tall and erect, slightly hairy. Leaves oblong or elliptical 9. *Hairy H.*

Stems diffuse, very woolly. Leaves orbicular 11. *Marsh H.*

Several half-shrubby or shrubby species, from southern Europe or the Canary or Azore Islands, are occasionally cultivated in our flower-gardens or shrubberies. A supposed British species described by Bertoloni under the name of *H. anglicum*, appears to have been founded on some mistake.

1. Large-flowered *Hypericum*. *Hypericum calycinum*, Linn. (Fig. 176.)

(Eng. Bot. t. 2017.)

Rootstock extensively creeping and woody. Stems scarcely a foot high, simple or branching at the base only, with large, almost sessile, ovate or oblong leaves, very obtuse, green and glabrous, with very small pellucid dots. Flowers bright yellow, 3 or 4 inches diameter, one or two at the top of each stem, or, in our gardens, in a corymb of 5 or 6. Sepals nearly 6 lines long, orbicular, with longitudinal glandular lines. Stamens very numerous, long and slender, united at the base into 5 bundles. Styles 5.

A south-east European species, long cultivated in our gardens, and now naturalized in bushy places in several parts of England and Ireland. *Fl. summer.*



Fig. 176.

2. Tutsan Hypericum. *Hypericum Androsæmum*, Linn.
(Fig. 177.)

(Eng. Bot. t. 1225, *sepals too pointed. Tutsan.*)



Fig. 177.

Stock short, somewhat woody; the flowering-stems usually numerous, erect, $1\frac{1}{2}$ to 2 feet high, simple or slightly branched. Leaves sessile, ovate, obtuse, cordate at the base, 2 to 3 inches long, glabrous, with very minute pellucid dots. Flowers few, in small corymbs, shorter than the last pair of leaves. Sepals broad, 3 or 4 lines long. Petals scarcely longer. Stamens numerous, slightly connected at the very base into 5 clusters. Styles 3. Capsule globular, slightly succulent before it is ripe, not usually opening in valves.

In shrubby places and open woods, in western and southern Europe, extending also far into central Asia. In Britain, all along the west side of Great Britain, in Ireland, and southern England, but rare on the eastern side. *Fl. summer.*

3. Common Hypericum. *Hypericum perforatum*, Linn.
(Fig. 178.)

(Eng. Bot. t. 295. *St. John's-wort.*)

Stock perennial, with short runners or decumbent barren shoots and erect stems, 1 to $1\frac{1}{2}$ feet high, branching in the upper part, cylindrical or with two slightly prominent opposite angles, and quite glabrous. Leaves sessile, oblong, seldom above 6 lines long, marked with pellucid dots, and occasionally a few black ones on the under side. Flowers bright yellow, in a handsome terminal corymb. Sepals lanceolate, pointed, quite entire, but with a few glandular lines or dots. Petals twice as long, marked, as well as the anthers, with black dots. Stamens numerous, shortly united into 3 bundles. Styles 3.

In woods, hedges and thickets, roadsides, etc., throughout Europe and central and Russian Asia, except the extreme north, and now introduced into other countries. Abundant in Britain. *Fl. summer and autumn.*

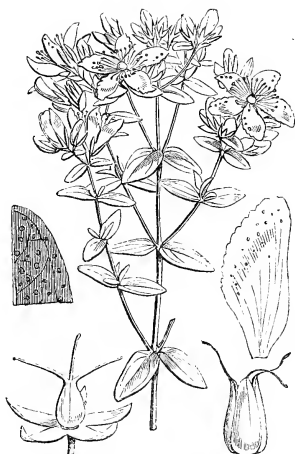


Fig. 178.

4. Imperforate *Hypericum*. *Hypericum dubium*, Leers.
(Fig. 179.)

(Eng. Bot. t. 296.)

Very much like the *common H.*, but the stem is slightly quadrangular, the leaves rather larger and broader, and nearly destitute of pellucid dots, but with a few black ones along the margin on the under side; the sepals much broader, obtuse or scarcely pointed, and the petals and stamens much less dotted.

In similar situations as the *common H.*, almost over all Europe, especially in hilly districts, extending far into Scandinavia, but not an Arctic plant. Generally spread over England, southern Scotland and Ireland, but not near so frequent as the *common H.* *Fl. summer.*



Fig. 179.

5. **Square-stalked Hypericum.** *Hypericum quadrangulum*, Linn. (Fig. 180.)

(Eng. Bot. t. 370.)

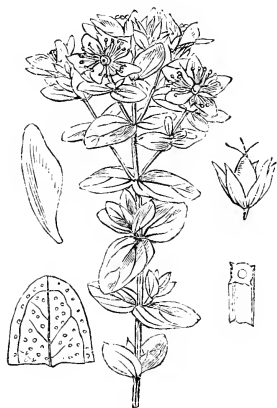


Fig. 180.

With the general habit of the last two species, this one is readily known by the four prominent angles of the stem, and the rather smaller and paler flowers. Leaves ovate, often an inch long, clasping the stem at the base, with numerous pellucid dots, and a few black ones round the margin on the under side. Sepals lanceolate and pointed. Petals and anthers with very few black dots, or entirely without them.

In moist pastures, by hedges and ditches, in central and southern Europe to the Caucasus, extending northward to southern Sweden. Common in England, Ireland, and southern Scotland, but decreasing in frequency towards the north. *Fl. summer.*

6. **Trailing Hypericum.** *Hypericum humifusum*, Linn. (Fig. 181.)

(Eng. Bot. t. 1226.)

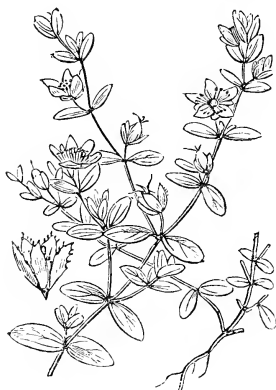


Fig. 181.

A low, decumbent, much branched, almost trailing plant, from 2 or 3 to near 6 inches long, sometimes forming dense, spreading tufts, with a perennial rootstock, but often flowering the first year, so as to appear annual. Leaves of the common *H.*, but smaller. Flowers few, small, of a pale yellow, in short, loose, leafy cymes. Sepals oblong, often unequal, entire or with a few glandular teeth, and generally bordered by black dots. Petals scarcely so long, with very few black dots. Stamens few.

In stony heaths, pastures and bogs, fields and waste places, in central and southern Europe to the Caucasus, ex-

tending northward to southern Sweden, and carried out to some other countries with European weeds. Frequent in England and Ireland, less so in Scotland. *Fl. summer and autumn.*

**7. Flax-leaved Hypericum. *Hypericum linariifolium*,
Vahl. (Fig. 182.)**

(Eng. Bot. Suppl. t. 2851.)

Intermediate in some measure between the *trailing H.* and the *common H.*; taller and more erect than the former, much smaller and more slender than the latter, seldom above 8 or 10 inches high. Leaves linear or narrow-oblong, 6 to 8 lines long, rarely marked with pellucid dots, but with a few black ones underneath. Flowers in a loose corymb, larger and brighter than in the *trailing H.*; the sepals oblong or broadly lanceolate, with numerous black dots, and a few glandular teeth on the edge. Petals twice or thrice as long as the sepals. Stamens not numerous.

On dry, hilly wastes and rocky places, in western Spain, Portugal, and France, extending to the Channel Islands and to south-western England, where it has been found at Cape Cornwall, and on the banks of the Teign, in Devonshire. *Fl. summer.*



Fig. 182.

**8. Slender Hypericum. *Hypericum pulchrum*, Linn.
(Fig. 183.)**

(Eng. Bot. t. 1227.)

Perennial stock shortly decumbent, the stems erect and stiff though slender, 1 to near 2 feet high, with short lateral branches, all perfectly glabrous. Leaves of the main stem broadly cordate and clasping the stem at the base, seldom above 6 lines long, those of the lateral branches smaller and much narrower, all marked with pellucid dots, but usually without black ones. Flowers rather smaller than in the *common H.*, forming an oblong or pyramidal panicle, not a flat corymb

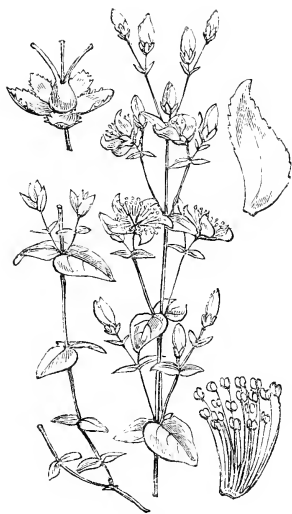


Fig. 183.

Sepals broad and obtuse, united to near the middle, without black dots outside, but fringed at the top with black glandular teeth.

In dry woods, on open heaths and wastes, almost all over Europe, but scarcely extending to the Asiatic frontier. Frequent in Britain. *Fl. summer.*

9. Hairy Hypericum. *Hypericum hirsutum*, Linn.

(Fig. 184.)

(Eng. Bot. t. 1156.)



Fig. 184.

A stiff, erect perennial, with an oblong or pyramidal panicle like the *slender H.*, but rather taller, and the stems always more or less downy or hairy. Leaves often above an inch long, oblong or elliptical, narrowed at the base into a very short stalk, more or less hairy underneath on the veins, and marked with numerous pellucid dots. Flowers of the *slender H.*, but of a paler yellow; the sepals narrow, fringed with rather long, glandular teeth; the petals full twice as long.

In woods and thickets, generally spread over Europe and Russian Asia, except the extreme north. Frequent in Britain. *Fl. summer.*

10. **Mountain Hypericum.** *Hypericum montanum*, Linn.

(Fig. 185.) (Eng. Bot. t. 371.)

Stock perennial, the stiff, erect stems about 2 feet high, usually simple, with the upper leaves small and distant, the lower leaves rather large, ovate, and stem-clasping, quite glabrous, with or without pellucid dots, but with a row of black ones round the margin underneath. Flowers in a close, compact cyme, often reduced to a head; the sepals lanceolate, fringed with black, glandular teeth; the petals twice as long, narrow, and paler than in the *common H.*

In woods, in central and southern Europe to the Caucasus, and northwards into southern Sweden. Not so frequent in England as the other species, and probably not extending into Scotland or Ireland. *Fl. summer.*

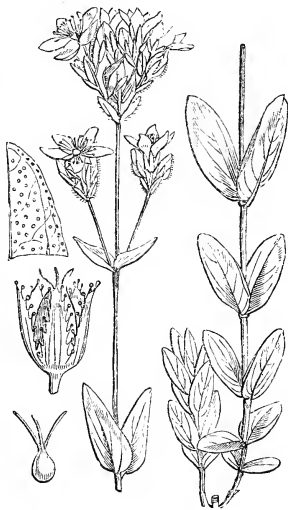


Fig. 185.

11. **Marsh Hypericum.** *Hypericum Elodes*, Linn.

(Fig. 186.) (Eng. Bot. t. 109.)

Stems diffuse, often rooting at the base, and attaining 6 to 8 inches, or, when very luxuriant, a foot in length, covered with loose, woolly whitish hairs. Leaves orbicular, stem-clasping, woolly on both sides. Flowers pale yellow, few together in a leafless cyme, at first terminal, but afterwards becoming lateral. Sepals small, ovate, copiously fringed with glandular teeth. Petals three times as long, with a small fringed appendage at their base. Stamens united to above the middle in 3 bundles.

In spongy and watery bogs, in western Europe, from Spain and Portugal to north-western Germany. Extends over the whole of the west of England, Wales, and Ireland, but rare in Scotland. *Fl. summer.*



Fig. 186

XVII. THE FLAX FAMILY. LINACEÆ.

Herbs or undershrubs, with entire leaves, no stipules, and regular flowers. Sepals 5, rarely fewer, overlapping each other in the bud, rarely partially united. Petals as many, twisted in the bud. Stamens as many, free, or the filaments very shortly united at the base, with small teeth between each (or, in exotic genera, 10 stamens). Styles 5, rarely fewer, often slightly connected at the base, with capitate stigmas. Ovary with as many cells as styles, or incompletely divided into twice as many. Capsule separating into as many carpels as cells, without any central column; each carpel opening inwards by longitudinal slits, and containing 2 seeds, often separated by an incomplete partition. No albumen.

A small Order, widely spread over the globe, differing from the *Geranium* family chiefly in the foliage and the absence of any persistent axis to the fruit, from the *Pink* family by the capitate stigmas and the structure of the fruit.

Parts of the flower in fives 1. FLAX.
Parts of the flower in fours 2. ALLSEED.

I. FLAX. LINUM.

Sepals, petals, and stamens 5. Cells of the capsule apparently 10 but really 5, each divided into two by a nearly complete partition.*

A rather numerous genus, spread over nearly the whole of the temperate and warmer regions of the globe, but chiefly abundant in the Mediterranean region and western Asia.

Flowers small, white. Lower leaves opposite 4. *Cathartic F.*
Flowers blue. Leaves all alternate.

Root annual. Sepals pointed.

Stem erect. Leaves lanceolate. Petals 7 or 8 lines long 1. *Common F.*

Stem decumbent. Leaves short and linear. Petals not

6 lines long 3. *Pale F.*

Rootstock perennial.

Sepals obtuse. Petals deep blue, 7 or 8 lines long . . 2. *Perennial F.*

Sepals pointed. Petals pale blue, not 6 lines long . . 3. *Pale F.*

The *L. flavum*, a south European perennial, with yellow flowers, and some other exotic species, are to be met with in our gardens.

1. **Common Flax.** *Linum usitatissimum*, Linn. (Fig. 187.)

(Eng. Bot. t. 1357. *Flax.* *Linseed.*)

A tall, erect annual, perfectly glabrous, and usually branched only at the top. Leaves alternate, erect, narrow-lanceolate, pointed and entire, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long. Flowers of a rich blue, in a loose terminal corymb. Sepals ovate or lanceolate, all pointed. Petals obovate, entire or slightly crenate, 7 or 8 lines long. Capsule globular or slightly depressed.

An extensively cultivated plant, whose origin is unknown, but it readily sows itself as a weed of cultivation in Europe, Asia, and other parts of the world, and as such may be occasionally met with in some parts of England. *Fl.* summer.



Fig. 187.

2. **Perennial Flax.** *Linum perenne*, Linn. (Fig. 188.)

(Eng. Bot. t. 40.)

A very variable plant, sometimes resembling much the *common F.*, but it forms a perennial stock, either tufted or root-like; the stems are usually more slender and not so erect, and sometimes quite procumbent, the leaves smaller and narrower, and the sepals, or at least the inner ones, are always obtuse.

In dry chiefly limestone pastures and waste lands, or sometimes in rich mountain pastures, varying much according to soil or situation, and widely diffused over central and southern Europe, and southern Russian Asia, but not extending into northern Germany. Occurs in some of the eastern counties of England, and possibly in southern Ireland, but the *pale F.* is often mistaken for it. *Fl.* summer.



Fig. 188.

3. Pale Flax. *Linum angustifolium*, Huds. (Fig. 189.)

(Eng. Bot. t. 381.)



Fig. 189.

Usually a perennial, with the decumbent stems and narrow leaves of some varieties of the *perennial F.*, but with the pointed sepals of the *common F.* It is also occasionally annual only, but always differs from both the preceding species in its much smaller pale-blue flowers, the petals seldom exceeding 5 lines in length.

In waste places, chiefly in limestone districts, very common in southern Europe, and extending up western France to southern and western England, and to Ireland. *Fl. summer.*

4. Cathartic Flax. *Linum catharticum*, Linn. (Fig. 190.)

(Eng. Bot. t. 382.)

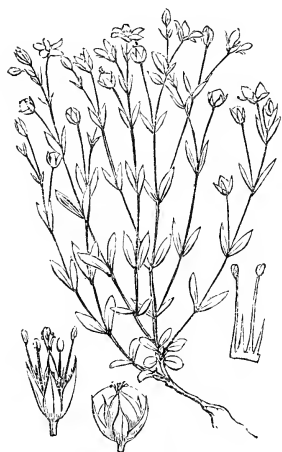


Fig. 190.

A very slender, erect, or slightly decumbent glabrous annual, from 3 or 4 to 6 or 8 inches high, with small, opposite, obovate or oblong leaves, and very small flowers, of a pure white, on long, slender pedicels. Sepals all pointed. Petals obovate, scarcely 2 lines long.

In meadows and pastures, very common throughout Europe, except the extreme north, and in west central Asia. Abundant in Britain. *Fl. all summer.*

II. **ALLSEED.** RADIOLA.

A single species, separated from *Flax* on account of the parts of the flower and fruit being in fours instead of in fives, and the sepals united to near the middle in a several-toothed calyx.

1. **Common Allseed.** *Radiola Millegrana*, Sm. (Fig. 191.)

(Eng. Bot. t. 893.)

A minute, erect annual, with very numerous, repeatedly forked branches, forming dense corymbose tufts, 1 to 2 inches high, with minute, globular flowers on short pedicels. Leaves small, opposite. Calyx-teeth 8 or 12. Petals 4, about the length of the calyx.



Fig. 191.

On sandy heaths and waste places, in central and southern Europe to the Caucasus, extending northward into southern Scandinavia. Generally spread over Britain, and very abundant in some localities, though scarce in other districts. *Fl. summer.*

XVIII. **THE MALLOW FAMILY.** MALVACEÆ.

Herbs or soft-wooded shrubs, with alternate, stipulate, palmately-veined leaves, and regular flowers. Calyx of 5 divisions, valvate in the bud, and (in the British genera) 3 or more bracts at the base, forming an involucre or so-called outer calyx. Petals 5, twisted in the bud, and adhering, by their short claws, to the staminal tube. Stamens numerous, their filaments united in a tube round the pistil, the anthers 1-celled. Ovaries (in the British genera) several, arranged in a ring round a common axis. Styles or style-branches as many as ovaries. Fruit (in the British genera) separating into as many carpels as ovaries. Seeds one or several in each carpel, attached to the inner angle, kidney-shaped, with a curved embryo and little albumen.

A very extensive, and generally natural family, widely distributed, chiefly over the warmer climates of the globe. The three British genera, all closely allied to each other, only represent one of the two forms of ovary and fruit prevailing in the Order. In *Hibiscus*, *Abutilon*, and several other exotic genera, the carpels are all united into a

single several-celled ovary and fruit, in *Pavonia* and some others there are twice as many style-branches as ovaries.

Exterior bracts united at the base into an involucre or outer calyx.

Involucre 3-lobed 1. *LAVATERA*.

Involucre of 5 or more divisions 3. *ALTHEA*.

Exterior bracts 3, distinct from each other, inserted on the calyx 2. *MALLOW*.

Among the plants of the *Mallow* family, grown in our gardens and belonging to exotic genera, the most frequently to be met with are species of *Malope*, *Hibiscus*, or *Abutilon*.

I. *LAVATERA*. *LAVATERA*.

Involucre 3-lobed, often larger than the 5-lobed calyx. Ovary and fruit of *Mallow*.

A genus of very few species, from the Mediterranean region, western Asia, southern Africa, and Australia.

1. *Sea Lavatera*. *Lavatera arborea*, Linn. (Fig. 192.)

(Eng. Bot. t. 1841.)

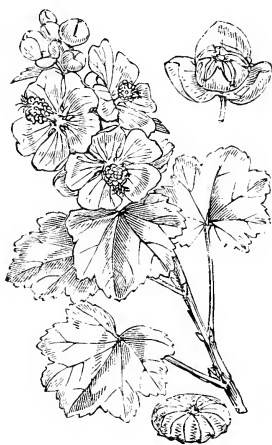


Fig. 192.

Stem woody at the base, with thick, hard, annual flowering branches, forming an undershrub 1 to 4 or 5 feet high. Leaves on long stalks, the lower ones broadly orbicular, palmately divided into 5 to 9 broad, short, crenate lobes, and softly downy on both sides, rarely nearly glabrous. Flowers numerous, of the size of those of the *common Mallow*, of a pale purple-red, on short pedicels, collected into clusters, forming a long terminal raceme or narrow panicle. Involucre divided to below the middle into 3 broad leaf-like lobes.

On maritime rocks, in south-western Europe, from the Gulf of Genoa, round Spain and France, to the British Isles, where it is very local, chiefly on the south and west coasts of England and Ireland, and on the Bass rock in the Frith of Forth. *Fl. summer*.

The *tree Lavatera* (*L. Olbia*), a south European species, often cultivated in our gardens, is said to have appeared along the sides of a new embankment in Epping Forest, and may occasionally sow itself in other parts of England.

II. **MALLOW.** MALVA.

Involucre of 3 small distinct bracts, inserted on the lower part of the calyx. Calyx divided to near the middle into 5 broad lobes. Style-branches 10 or more, subulate. Carpels as many, arranged in a ring round a thickish axis, and separating from it when ripe, each one containing a single seed.

The genus, as now limited, is dispersed over Europe and northern and central Asia.

Stems decumbent or prostrate. Petals not above twice as long

as the calyx. 1. *Dwarf M.*

Stem erect or ascending. Petals 3 or 4 times the length of the calyx.

Leaves with short, broad lobes, not reaching to the middle.

Flowers in axillary clusters 2. *Common M.*

Leaves deeply cut into narrow lobes. Flowers crowded at

the summit of the branches 3. *Musk M.*

The tall *tree Mallow* (*M. mauritiana*), from the Mediterranean, and the *curled Mallow* (*M. crispa*), from central Asia, are often to be met with in cottage gardens. Several Cape species are also in cultivation.

1. **Dwarf Mallow.** *Malva rotundifolia*, Linn. (Fig. 193.)

(Eng. Bot. t. 1092.)

A procumbent annual, with a hard, sometimes woody-looking base, the stems 6 inches to a foot long, tough, and slightly downy. Leaves on long stalks, orbicular, cordate at the base, with 5 to 7 very short and broad crenate lobes. Flowers clustered in the axils of the leaves, small, and of a pale-bluish colour, on pedicels $\frac{1}{2}$ to 1 inch long. Petals 4 to 5 lines long. Carpels usually about 15, downy, and rounded on the back, so as to form together a disk-shaped fruit, slightly furrowed on the margin between each two carpels.

On roadsides in waste places, throughout Europe and western Asia, except the extreme north. Common in England, Ireland, and southern Scotland, less so further north. *Fl. spring to autumn.*



Fig. 193.

The *small-flowered M.* (*M. parviflora*, Linn., or *M. pusilla*, Eng. Bot. t. 241), from southern Europe and other warm climates, and extending northward into Scandinavia, is said to have been formerly found in Kent. It has the small flowers of the *dwarf M.*, but is chiefly distinguished by the carpels not rounded, but flat on the back, with angular edges, as in the *common M.* The *whorled M.* (*M. verticillata*, Eng. Bot. Suppl. t. 2953), from southern Europe and central Asia, with the flowers and fruit of the *small-flowered M.*, but erect stems, and the flowers in close clusters, has appeared in cornfields near Llanelly, in South Wales.

2. Common Mallow. *Malva sylvestris*, Linn. (Fig. 194.)

(Eng. Bot. t. 671.)



Fig. 194.

A biennial, with several erect or ascending stems, 1 to 2 or even 3 feet high, more or less clothed with spreading hairs, especially in the upper part. Leaves on long stalks, orbicular, slightly cordate at the base, with 5 or 7 lobes, broad and short, but always deeper than in the *dwarf M.*, and the middle one often longer than the others. Flowers in axillary clusters, usually of a reddish purple; the petals about 9 or 10 lines long. Carpels usually 10, flat on the back, with angular edges, so that the fruit has rather projecting ribs than furrows between the carpels.

In waste places, on roadsides, etc. Common in Europe, except at high northern latitudes, and extending all across Russian Asia. Abundant in England and Ireland, decreasing to the northward, and probably not indigenous north of the Grampians. *Fl. summer.*

3. Musk Mallow. *Malva moschata*, Linn. (Fig. 195.)

(Eng. Bot. t. 754.)

A perennial, with several erect, simple or slightly-branched stems, about 18 inches high, covered with long, spreading hairs. Radical leaves orbicular, with short, broad lobes, but those of the stem deeply

divided into linear or wedge-shaped segments, which are again pinnatifid or 3-lobed. Flowers large, rose-coloured or rarely white, crowded at the summits of the stem and branches. Carpels rounded on the back, and very hairy.

On hedge-banks, roadsides, and in gravelly pastures, in western, central, and southern Europe, extending northwards to south Sweden, and eastward to Dalmatia. Not uncommon in England, Ireland, and southern Scotland. *Fl. summer.*



Fig. 195.

III. **ALTHÆA.** ALTHÆA.

Involucre of more than 5 bracts, more or less united together at the base. Calyx 5-lobed. Ovary and fruit of *Mallow*.

A small genus, chiefly from the Mediterranean region and western Asia, with one or two South African species.

Tall perennial, covered with a short, velvety down 1. *Marsh A.*

Annual, with long, spreading, stiff hairs 2. *Hispid A.*

The *Hollyhock* of our gardens is an *Althæa* from the Mediterranean region. The *Althæa frutex* of our gardeners is improperly so called, for it is a species of *Hibiscus* (*H. syriacus*, Linn.).

1. **Marsh Althæa.** *Althæa officinalis*, Linn. (Fig. 196.)

(Eng. Bot. t. 147. *Marsh Mallow*.)

Stock perennial, the flowering stems erect, branched, 2 to 3 feet high, covered, as well as the foliage and inflorescence, with a soft, dense, velvety down. Leaves stalked, broadly ovate, undivided or 3-lobed, the lower ones often cordate at the base, the upper ones narrow. Flowers not large, of a pale rose-colour, on short pedicels in the upper axils, or the greater number forming almost leafless terminal spikes. Involucre divided into several linear segments, much shorter than the 5-lobed calyx. Carpels 15 to 20, rounded on the back.



Fig. 196.

In marshes, especially in maritime districts, in central and southern Europe, and all across Russian Asia, extending to northern Germany, but not into Scandinavia. Not uncommon in southern England and some parts of Ireland, but not extending to the north of Lincolnshire or Arran. *Fl.* rather late in summer.

2. Hispid Althæa. *Althæa hirsuta*, Linn. (Fig. 197.)

(Eng. Bot. Suppl. t. 2674, *flowers too red.*)

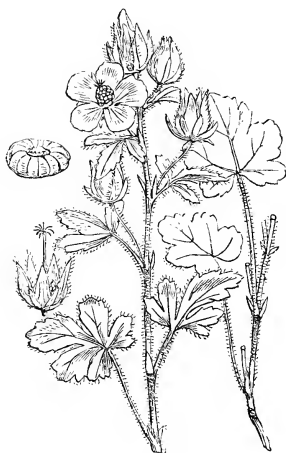


Fig. 197.

An erect, stiff, but rather slender annual, seldom above a foot high, hispid with long spreading hairs. Leaves few, the upper ones divided into 3, 5, or 7 narrow segments. Flowers of a pale purplish-blue, on long axillary peduncles. Involucre of 8 to 20 lanceolate lobes, nearly as long as the calyx, the petals about one-half longer. Carpels numerous, somewhat angular on their edges.

In waste and cultivated places, common in southern Europe, up to the Palatinate of the Rhine, and occasionally carried to the northward as a weed of cultivation. Probably introduced as such into Kent, where it is said to have fully established itself near Cobham. *Fl.* summer.

XIX. THE LIME FAMILY. TILIACEÆ.

A rather large tropical Order, but limited in Britain to a single species. It differs from the *Mallow* family by the petals imbricated but not twisted in the bud; the stamens free, or shortly united into several bundles: the anthers 2-celled, and the carpels more completely consolidated into a several-celled ovary.

I. **LIME.** TILIA.

Trees with alternate leaves, deciduous stipules, and small cymes of flowers on an axillary peduncle, to which is attached a long, leaf-like bract. Sepals 5, valvate in the bud. Petals 5. Stamens numerous, very shortly cohering in several clusters. Ovary globular, 5-celled, with 2 ovules in each cell, attached to the inner angle. Style single, with a 5-toothed stigma. Fruit, a small globular nut, containing 1 or 2 seeds.

A genus of very few species, widely distributed over the temperate zone of the northern hemisphere, where it is the only representative of the family.

1. **Common Lime.** *Tilia europæa*, Linn. (Fig. 198.)

(Eng. Bot. t. 610. *T. parvifolia*, Eng. Bot. t. 170. *Lime-tree*.)

A handsome, long-lived tree, attaining sometimes as much as 120 feet in height, but generally not above half that size. Leaves stalked, broadly heart-shaped or nearly orbicular, often oblique, and always pointed, serrate on the edge, glabrous above and more or less downy underneath, especially in the angles of the principal veins. Peduncles hanging amongst the leaves, bordered or winged halfway up by the long, narrow, leaf-like bract. Flowers sweet scented, of a pale whitish-green. Nut downy when young, but often glabrous when ripe.

In woods, over nearly the whole of Europe, except the extreme north, and extending eastward across Russian Asia

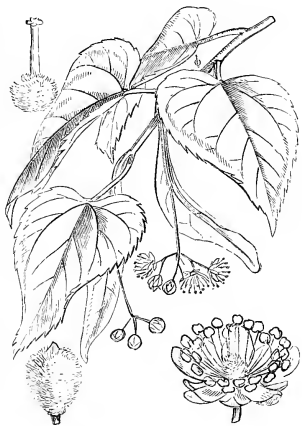


Fig. 198.

to the Altai. Much planted in Britain, and probably truly wild in southern and western England, and perhaps in Ireland. *Fl. summer*. It varies much in the size of the leaves, in the degree of down on their under surface and on the fruits, in the greater or less prominence of the 5 filiform ribs of the fruit, etc. The truly indigenous form in northern Europe is always a small-leaved one. The large-leaved variety which we commonly plant (*T. grandifolia*, Eng. Bot. Suppl. t. 2720) is of south European origin, with the leaves still further enlarged by cultivation. Some North American species are also frequently planted.

XX. THE GERANIUM FAMILY. GERANIACEÆ.

Annual or perennial herbs, or, in exotic species, low shrubs, with opposite or rarely alternate leaves, usually more or less toothed, divided, or compound, and furnished with stipules. Flowers regular in the principal British genera, irregular in *Balsam* and some exotic ones. Sepals (in the regular flowers) 5, overlapping in the bud. Petals 5, twisted in the bud. Stamens 5 to 10, often united at the base. Ovary 5-lobed and 5-celled, with one or several seeds in each, all attached to the central axis. Styles 5. Fruit 5-lobed, the carpels opening or partially falling off when ripe, leaving a central, persistent axis. In the genera with irregular flowers these characters are much modified (see *Balsam*).

The *Geranium* family resembles the *Pink* and *Mallow* families in the twisted arrangement of their petals, but differs from the former in foliage as well as in fruit, and from the latter in the definite stamens. The species are distributed nearly all over the globe, but most numerous in the temperate regions of the northern hemisphere, and more especially in south-western Africa. The limits of the Order are as yet very unsettled, some botanists including *Flaxes*, and many other exotic genera, whilst others exclude *Balsam*, *Oxalis*, and *Tropeolum*, confining it to the old Linnæan genus *Geranium*.

Flowers regular.

Leaves opposite, cut or toothed. Carpels 1-seeded, round
base of a long-beaked receptacle or axis.

Ten stamens	1. GERANIUM.
Five stamens	2. ERODIUM.

- Leaves radical, with three entire leaflets. Receptacle or axis
not beaked. Carpels with several seeds 3. OXALIS.
Flowers very irregular, spurred. Leaves alternate. Capsule
with several seeds 4. BALSAM.

The Cape *Pelargoniums*, so frequent in our greenhouses, belong to the *Geranium* family. The South American *Tropæolums*, including the common *Nasturtium* of our gardeners, are very nearly allied to *Pelargonium*, although some botanists now propose to remove them far away from the family.

I. GERANIUM. GERANIUM.

Herbs, with forked stems often swollen at the nodes, opposite, palmately-divided leaves, and purplish flowers, solitary or two together, on axillary peduncles. Stamens 10, of which 5 shorter, but generally with anthers. Ovary 5-lobed, terminating in a long beak with 5 short stigmas on the top, the lobes being all whorled round the long-beaked receptacle. Capsule separating into 5 one-seeded carpels, which curl upwards, with a long elastic awn, detached from the beak, and glabrous inside.

A genus spread over the northern hemisphere, with a few species in the southern, but always without the tropics. It is easily distinguished from all but *Erodium* by the long beak of the fruit, which has given to the two genera *Geranium* and *Erodium* the popular name of *Crane's-bill*.

Rootstock perennial. Flowers usually large.

Peduncles 1-flowered 1. *Blood G.*

Peduncles with 2 (rarely 3) flowers.

Petals deeply notched. (Flowers not so large) 5. *Mountain G.*

Petals entire or slightly notched.

Petals dark-purple, very spreading or almost reflexed. Points of the sepals very short 2. *Dusky G.*

Petals bluish-purple. Sepals with long fine points.

Pedicels of the fruit erect. Flowers numerous, corymbose 3. *Wood G.*

Pedicels of the fruit spreading or reflexed.
Flowers in a loose panicle 4. *Meadow G.*

Annuals, with small flowers.

Leaves of 3 distinct segments, which are pinnately cut or divided 6. *Herb-Robert G.*

Leaves palmately cut or divided into 5 or more lobes or segments.

Calyx pyramidal, with projecting angles. Petals entire, much longer than the sepals 7. *Shining G.*

Calyx scarcely angular. Petals about as long, unless deeply notched.

Leaves divided to the base into 5 or more narrow cut segments.

Peduncles much shorter than the leafstalks.

Leaves much divided. Seeds dotted . . . 11. *Cut-leaved G.*

Leaves small, the lower ones divided to the middle only. Seeds smooth . . . 9. *Small-flowered G.*

Peduncles and pedicels long and slender. Leaves much divided . . . 12. *Long-stalked G.*

Leaves orbicular, seldom divided below the middle.

Petals deeply notched.

Petals twice as long as the calyx . . . 5. *Mountain G.*

Petals not longer than the calyx . . . 8. *Dove's-foot G.*

Petals entire or slightly notched.

Leaves shortly divided into broad lobes. Seeds

dotted . . . 10. *Round-leaved G.*

Leaves divided to the middle. Seeds smooth 9. *Small-flowered G.*

Two other Continental perennial species are included in some of our Floras as having occasionally strayed from gardens; the *striate G.* (*G. striatum*), with long hairs on the stems, and rather large flowers, the petals very pale, elegantly veined, and rather deeply notched; and the *knotty G.* (*G. nodosum*, Eng. Bot. t. 1091), a glabrous plant, the lobes of the leaves very pointed, and the petals of a purplish red, much less notched. *G. macrorhizon* and several other exotic perennials are also cultivated in our flower-gardens.

1. Blood Geranium. *Geranium sanguineum*, Linn.

(Fig. 199.)

(Eng. Bot. t. 272.)

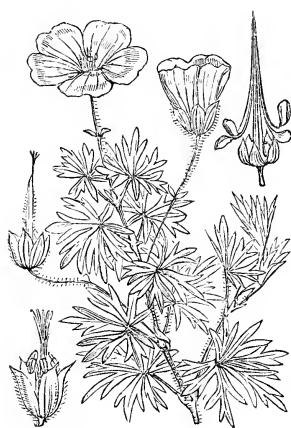


Fig. 199.

Rootstock thick and woody, sometimes creeping. Stems numerous, about a foot long, decumbent or rarely erect, with spreading hairs. Leaves nearly orbicular, but divided to the base in 5 or 7 segments, which are again cut into 3 or 5 narrow lobes. Flowers large, of a dark purple, growing singly on long, slender peduncles. Sepals hairy, with a fine point. Petals twice as long, obovate, slightly notched, and very spreading.

In dry woods and pastures, in temperate and southern Europe to the Caucasus, penetrating far into Scandinavia. In Britain, it occurs in many localities and yet is not very general. *Fl. sum-*

mer. A variety with more flesh-coloured flowers, and of shorter growth, originally found in the Isle of Walney, Lancashire, has been published as a species, under the name of *G. lancastriense*.

2. Dusky Geranium. *Geranium phæum*, Linn. (Fig. 200.)

(Eng. Bot. t. 322.)

Rootstock and general mode of growth of the *wood G.*, but the stems are weaker, with fewer flowers, the leaves less deeply cut, with broader lobes, and the petals, of a dark, dingy purple colour, are broadly obovate, quite entire, and spread very open from the base, or are almost reflexed.

In woods and meadows, in hilly districts, in central and western Europe, not extending to its eastern limits, and in northern Europe only as an introduced plant. In Britain, also believed to be an introduced plant, although said to be apparently wild in some parts of Westmoreland and Yorkshire. *Fl. all summer.*

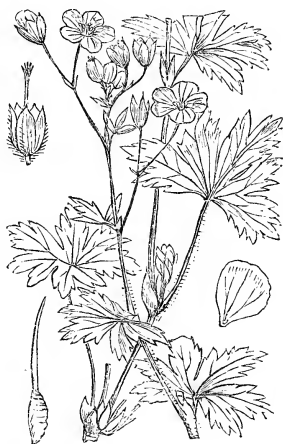


Fig. 200

3. Wood Geranium. *Geranium sylvaticum*, Linn.

(Fig. 201.)

(Eng. Bot. t. 121.)

Rootstock very short, covered with the brown scarious stipules of the old leaves. Stems erect or ascending, 1 to 2 feet high or rather more. Radical leaves on long stalks, palmately divided almost to the base with 5 or 7 pointed lobes more or less cut and serrated. Stem-leaves few, on much shorter stalks. The upper part of the stem is repeatedly forked, forming a rather dense, corymbose panicle of handsome purplish flowers. Peduncles short, each with two flowers, on short pedicels, which remain erect when the fruit ripens. Sepals ending in a fine point above a line long. Petals obovate, slightly notched, scarcely twice

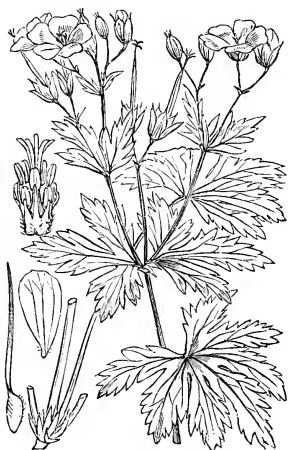


Fig. 201.

as long as the calyx. Filaments of the stamens hairy, scarcely flattened.

In moist woods and thickets, and mountain meadows, throughout Europe and Russian Asia, extending to the Arctic regions. In Britain, chiefly in western, central, and northern England, Scotland, and northern Ireland. *Fl. summer.*

4. Meadow Geranium. *Geranium pratense*, Linn. (Fig. 202.)

(Eng. Bot. t. 404.)



Fig. 202.

Distinguished from the *wood G.*, chiefly by its more cut leaves, and larger bluish-purple flowers loosely paniced on longer peduncles; the pedicels always more or less spreading or reflexed after flowering. The filaments are also much flattened in their lower part, and the claws of the petals ciliated on the edge, not bearded inside.

In meadows, woods, and thickets, roadsides, etc., widely spread over Europe and Russian Asia, but not an Arctic species, although, like the last, chiefly a mountain plant in southern Europe. In Britain, rather less frequent than the *wood G.*, not extending so far north in Scotland, but more widely spread in southern England; not recorded in the Irish Flora. *Fl. summer.*

5. Mountain Geranium. *Geranium pyrenaicum*, Linn.

(Fig. 203.)

(Eng. Bot. t. 405.)

A perennial, like the last four species, but with smaller flowers, and much of the habit of the annual ones. Stems often 2 feet long or more, and branched, more or less covered with short, soft hairs. Leaves orbicular, deeply cut into 5 or 7 coarsely toothed, usually obtuse lobes. Flowers numerous, on slender pedicels, two together on each peduncle. Sepals scarcely 2 lines long. Petals about twice their length, pale-purple and veined, deeply notched.

A native of the hilly districts of central and southern Europe to the Caucasus, but frequently naturalized on roadsides and waste places further to the north. In Britain it appears to be fully established in several parts of England, southern Scotland, and Ireland. *Fl.* *spring and summer.*



Fig. 203.

6. Herb-Robert Geranium. *Geranium Robertianum*, L.

(Fig. 204.)

(Eng. Bot. t. 1486. *Herb-Robert*.)

An erect or spreading, much branched annual, 6 inches to near a foot high, generally bearing a few soft hairs, often turning bright-red in all its parts, and smelling disagreeably when rubbed. Leaves divided into 3 pinnate or twice pinnate segments, never orbicular or palmate (except the 3 primary divisions). Flowers rather small. Sepals hairy, with long points. Petals reddish-purple or rarely white, sometimes nearly twice the length of the calyx, obovate and entire, with glabrous, erect claws. Carpels glabrous, with a few transverse wrinkles.

In stony and waste places, open woods, etc., very common through-



Fig. 204.

out Europe, Russian and central Asia, northern America, short of the Arctic Circle. Abundant in Britain. *Fl. the whole season.* A maritime variety, with thicker leaves and smaller flowers, has been described under the name of *G. purpureum* (Eng. Bot. Suppl. t. 2648.)

7. Shining Geranium. *Geranium lucidum*, Linn. (Fig. 205.)

(Eng. Bot. t. 75, *the leaves not correct.*)

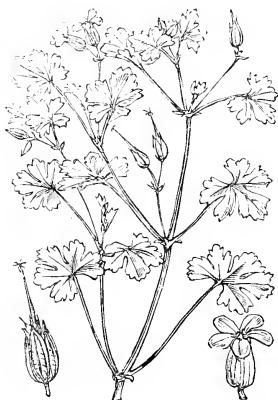


Fig. 205.

An annual, often turning red like the *Herb-Robert G.*, but always glabrous and shining, and the leaves are orbicular and palmately lobed, with broad segments usually obtuse, or rarely slightly pointed. It is easily distinguished also from all our *Geraniums* by the pyramidal calyx, the edges of the erect sepals forming very projecting angles. Petals like those of the *Herb-Robert G.*, but smaller.

In stony and waste places, on old walls, etc., in temperate and southern Europe and central Asia, extending northwards into Scandinavia. Generally distributed over Britain, excepting northern Scotland. *Fl. spring and summer.*

8. Dove's-foot Geranium. *Geranium molle*, Linn.

(Fig. 206.)

(Eng. Bot. t. 778.)

An annual, often tufted at the base, more or less covered with rather long, soft, spreading hairs; the stems weak and spreading, very short when first flowering, and seldom attaining a foot. Radical leaves numerous, on very long stalks, orbicular, rather above an inch diameter, divided to below the middle into 7 to 11 obovate or wedge-shaped lobes, which are again 3- or 5-lobed; the upper leaves few, small, with fewer but deeper and narrower divisions. Peduncles shorter than the leaves, each with 2 small purplish flowers; the sepals obtuse or scarcely pointed; the petals deeply notched, scarcely longer than the calyx. Carpels distinctly marked with transverse wrinkles. Seeds quite smooth, without dots.



Fig. 206.

In waste and cultivated places, throughout Europe, except perhaps the extreme north, and spread over many other countries as a weed of cultivation. Abundant in Britain. *Fl. the whole season.*

9. Small-flowered Geranium. *Geranium pusillum*, Linn.

(Fig. 207.)

(Eng. Bot. t. 385.)

Very near the *dove's-foot G.*, but less hairy, and the leaves usually smaller and more deeply divided. Sepals with a short but distinct point. Petals but slightly notched. Carpels not wrinkled, but hairy as in the *round-leaved G.*, whilst the seeds are as smooth as in the *dove's-foot G.* Five of the stamens have usually, and perhaps constantly, no anthers, as in *Erodium*. The upper leaves are sometimes divided to the base; the species is then distinguished from the *cut-leaved G.* by the smaller leaves and smooth seeds.

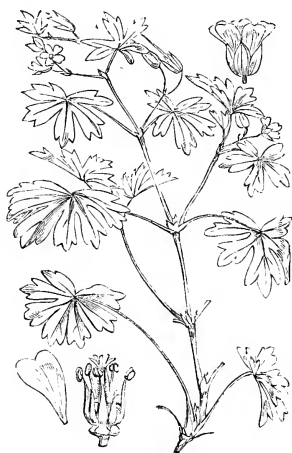


Fig. 207.

In waste and cultivated places, throughout Europe, except the extreme north, but not generally so common as the *dove's-foot G.* In Britain certainly not so abundant as that species, but perhaps sometimes mistaken for it, and thus overlooked. *Fl. all summer.*

10. Round-leaved Geranium. *Geranium rotundifolium*, L.
(Fig. 208.)

(Eng. Bot. t. 157.)

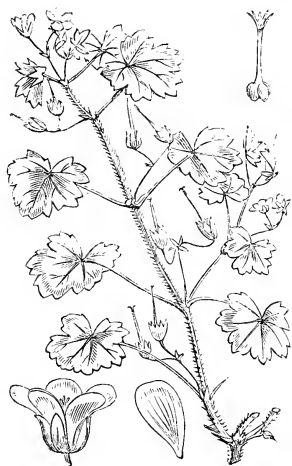


Fig. 208.

Usually rather a stouter plant than the *dove's-foot G.*, but with the same orbicular leaves and soft hairs; the lobes of the leaves rather broader, more obtuse, and not so deep; the peduncles shorter; the flowers still smaller, with entire obovate petals, scarcely exceeding the slightly pointed sepals. Carpels hairy, without wrinkles, and the seeds dotted, as in the two following species.

In waste and cultivated places, recorded as common in Europe and Russian Asia, and certainly so in the south, much less frequent in the north, the *dove's-foot G.* being, probably, frequently mistaken for it. In Britain rather scarce, chiefly occurring in southern and central England, and some parts of Ireland. *Fl. summer.*

11. Cut-leaved Geranium. *Geranium dissectum*, Linn.

(Fig. 209.)

(Eng. Bot. t. 753.)

An annual, like the last three, but often more erect, and usually more branched, and the leaves much more deeply divided into 5, 7 or 9 narrow segments, which are again deeply trifid or lobed. Peduncles very short, bearing two small purple flowers; the sepals rather larger than in the last three species, with distinct subulate points; the petals about their length, slightly notched. Carpels hairy, without wrinkles. Seeds beautifully and minutely reticulated or dotted. The hairiness of the plant is variable; usually the stems are clothed with long, reflexed hairs, the leaves with a short, soft down.

In dry pastures, waste and cultivated places, common in Europe and Russian Asia, except the extreme north, a slight variety or closely allied species, equally common in North America, and another larger-flowered perennial form extends over western North America, the greater part of South America, southern Australia, and New Zealand. Abundant in Britain. *Fl. spring and summer.*



Fig. 209.

12. Long-stalked Geranium. *Geranium Columbinum*, L.

(Fig. 210.)

(Eng. Bot. t. 259.)

An annual, with slender, decumbent, slightly hairy stems; the leaves deeply divided as in the *cut-leaved G.*, but the segments still narrower, mostly linear; the peduncles and pedicels longer and more slender; the calyx considerably longer, with long, slender points. Petals entire or notched, seldom exceeding the calyx. Carpels but slightly hairy, or quite glabrous, not wrinkled. Seeds dotted as in the *cut-leaved G.*

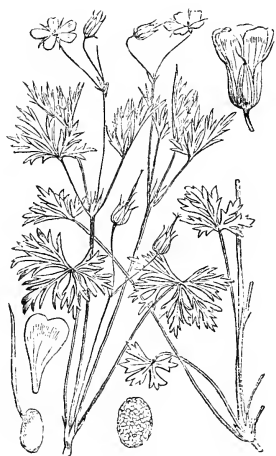


Fig. 210.

In dry pastures, on banks and waste places, widely spread over Europe and Russian Asia, except the extreme north. Not so common as the *cut-leaved G.* in Britain, and very local in Scotland. *Fl.* spring and summer.

II. **ERODIUM.** ERODIUM.

Prostrate or decumbent herbs, differing from *Geranium* in the divisions or nerves of the leaves being pinnate, not palmate; in the stamens always reduced to 5, the 5 alternate ones being rudimentary only; in the awns of the carpels bearded with a few long hairs on the inside, and spirally twisted after they are detached from the axis. The flowers are also frequently more than two together, in an umbel on the summit of the peduncle.

The geographical range is nearly that of *Geranium*, in which genus it was included by Linnæus. But the greater number of the species are maritime plants from the Mediterranean regions, or roadside weeds, with flowers so insignificant, that but few have ever been cultivated.

Leaves pinnate, with distinct segments.

Segments deeply pinnatifid, with toothed lobes.

Flowers of a reddish purple. 1. *Common E.*

Segments ovate, coarsely toothed or shortly lobed.

Flowers of a bluish purple 2. *Musk E.*

Leaves toothed or lobed, but not divided into distinct segments.

Leaves ovate 3. *Sea E.*

Leaves palmately lobed *Small-flowered Geranium.*

1. Common Erodium. *Erodium cicutarium*, L'Hér.

(Fig. 211.)

(Eng. Bot. t. 1768.)

Usually an annual, but often forming a dense tuft, with a thick taproot, and in some situations lasting at least a second year, always more or less covered with spreading hairs, which are sometimes viscid. Stems sometimes exceedingly short, sometimes lengthening out to 6 inches or near a foot. Leaves mostly radical, pinnate, on long stalks, the segments distinct and deeply pinnatifid, with narrow, more or less cut lobes. Peduncles erect, bearing an umbel of from 2 or 3 to 10 or 12 small purple or pink flowers. Sepals pointed, about the length of the obovate, entire petals. Carpels slightly hairy, the beak varying from 6 to 18 lines in length.

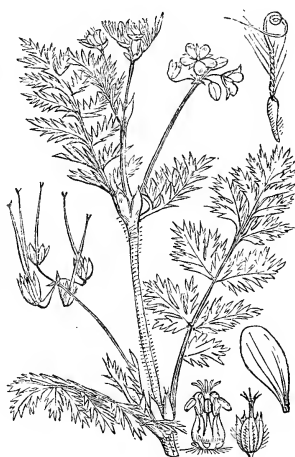


Fig. 211.

In waste and cultivated lands and dry pastures, especially near the sea, and on roadsides; very common in Europe, Russian and central Asia, and northern America, short of the Arctic Circle. Generally distributed over Britain. *Fl. spring and summer*. A maritime, more viscid, and hairy variety, known in southern Europe as *E. hirtum*, is also found on our own coasts.

2. Musk Erodium. *Erodium moschatum*, L'Hér. (Fig. 212.)

(Eng. Bot. t. 902.)

A much larger and coarser plant than the *common E.*, often emitting a strong smell of musk. Stems often a foot long. Leaves on long footstalks, with from 9 to 11 distinct, ovate, segments or leaflets, often cordate at the base, and deeply toothed or shortly pinnatifid. Flowers generally numerous in the umbel, of a bluish purple, rather larger than in the *common E.*, although the petals are scarcely longer than the calyx. Peduncles often 6 or 8 inches long.



Fig. 212.

In sandy, waste places and heaths, especially near the sea, in western and southern Europe. Abundant in the Channel Islands, in some parts of the south of Ireland, and occurring occasionally on the southern and western coasts of England. *Fl. summer.*

3. Sea Erodium. *Erodium maritimum*, L'Hér. (Fig. 213.)
(Eng. Bot. t. 646.)

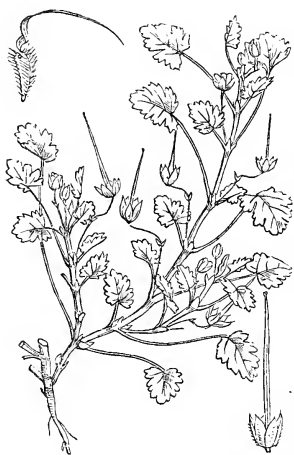


Fig. 213.

A small, softly hairy, often viscid annual, with the same varying habit as the common *E.*, but easily distinguished by the simple, not pinnate leaves, often not above half an inch long, ovate-cordate, more or less toothed or even lobed, but seldom beyond halfway to the midrib. Peduncles seldom longer than the leaves, with 1, 2, or rarely more, small, reddish-purple flowers. Beak of the fruit seldom above 6 lines long; the hairs of the inside of the awn very few, perhaps sometimes entirely wanting.

In maritime sands, in western Europe, and on the Mediterranean, where it varies much more than with us, and should probably include several species of modern botanists. Not uncommon on the south and west coasts of England, up to the south of Scotland, less frequent in Ireland. Has been found also in some inland situations in England. *Fl. all summer.*

III. **OXALIS.** OXALIS.

Herbs, either annual, or with a tuberous or creeping, perennial rootstock, and, in European species, palmately trifoliate, long-stalked leaves. Flowers solitary, or several in an umbel, on radical or axillary peduncles. Sepals 5. Petals 5. Stamens 10. Ovary angular, not beaked, 5-celled, with several ovules in each cell. Styles 5, short, scarcely united at the base. Capsule with 5 angles, opening in as many valves.

A very numerous genus, widely diffused over the temperate and hotter regions of the globe. A few tropical species have entire or pinnate leaves, and are occasionally undershrubs; but the great mass of the genus, like the few European species, are remarkable for their leaves, with 3 obovate leaflets like those of a *Clover*.

Flowers white. Peduncles radical, 1-flowered 1. *Sorrel O.*

Flowers small, yellow. Stem elongated. Peduncles axillary 2. *Procumbent O.*

Many exotic species, with yellow or reddish flowers, have at various times been cultivated, either in our flower-gardens, or, for their tuberous rootstocks, as esculents.

1. **Sorrel Oxalis.** *Oxalis Acetosella*, Linn. (Fig. 214.)

(Eng. Bot. t. 762. *Wood-sorrel*.)

Rootstock shortly creeping, slender, but often knotted with thickened scales. Leaves radical, with long stalks, and 3 obovate, delicately green leaflets, with a slightly acid flavour. Peduncles radical, long and slender, bearing a single, rather large white flower, and 2 small bracts, about halfway up. Sepals small, ovate, obtuse, thin. Petals obovate, about 6 lines long. Capsule ovoid, with 2 shining black seeds in each cell.

In woods, throughout Europe, Russian and central Asia, and northern America. Abundant in Britain. *Fl. early spring*. This is the original of the Irish *Shamrock*, although that emblem is now represented by the *white Clover*.



Fig. 214.

2. Procumbent *Oxalis*. *Oxalis corniculata*, Linn. (Fig. 215.)

(Eng. Bot. t. 1726.)



Fig. 215.

A more or less downy annual, or, in warmer climates, a perennial, with slender, spreading branches, seldom above 6 inches long. Leaves of 3 deeply obcordate leaflets, with small stipules at the base of the leafstalks. Peduncles slender, axillary, bearing an umbel of from 2 to 4, or rarely 5, pale yellow flowers, much smaller than in the *Sorrel O.*

Believed to be of American origin, but now a common weed in all the hotter, and most of the temperate regions of the globe. In Britain, only in a few localities in southern England, except where accidentally introduced into gardens. *Fl. the whole season.* A closely allied American species, the *O. stricta*, with a more erect stem and no perceptible stipules, has also occasionally appeared among garden weeds.

IV. **BALSAM.** IMPATIENS.

Herbs, mostly glabrous or almost succulent, with alternate, undivided leaves, no stipules, and very irregular flowers. Sepals and petals all coloured, and consisting usually of 6 pieces, viz.: 2 outer, opposite (sepals), flat and oblique; the next (upper sepal, although by the twisting of the pedicel it hangs lowest), large, hood-shaped, ending below in a conical spur; the fourth (lower petal, but uppermost from the twisting of the pedicel), much smaller, but yet very broad, and somewhat concave; the 2 innermost (petals) very oblique and irregularly shaped, more or less divided into two unequal lobes. Stamens 5, with very short, thick filaments, the anthers cohering in a mass round the pistil. Ovary 5-celled, with several ovules in each cell. Stigmas 5, minute, sessile or nearly so. Capsule bursting elastically in 5 valves, which roll inwards, scattering the seeds.

A numerous genus, chiefly East Indian, with a few North American species.

Flowers yellow. Spur of the calyx loosely bent back, and entire 1. *Yellow B.*
 Flowers orange-brown. Spurs closely bent back upon the calyx,
 and notched at the extremity 2. *Orange B.*

Several East Indian species are cultivated for their flowers, and amongst them the well-known *garden Balsam* (*I. Balsamina*), whose flowers become double with great readiness.

1. **Yellow Balsam.** *Impatiens Noli-me-tangere*, Linn.
 (Fig. 216.)

(Eng. Bot. t. 937. *Touch-me-not*.)

An erect, glabrous, branching annual, 1 to 2 feet high; the stem rather succulent, and swollen at the nodes. Leaves stalked, ovate, pointed, toothed, of a pale green, and very flaccid. Peduncles axillary, slender, bearing one or two perfect flowers, which are large and showy, yellow, spotted with orange; the hooded sepal ending a long spur, curved upwards, and bent back upon the flower. These flowers seldom set their seed in this country; the pods are chiefly produced by minute, imperfect flowers, of which there are several on the same peduncles as the perfect ones.

In moist woods and shady places, in the hilly districts of Europe and Russian Asia, extending northwards into Scandinavia. In Britain, chiefly in northern England and North Wales, extending neither into Scotland nor Ireland. *Fl. summer, till rather late.*



Fig. 216.

2. **Orange Balsam.** *Impatiens fulva*, Nutt. (Fig. 217.)

(Eng. Bot. Suppl. t. 2794.)

An annual, closely resembling the *yellow B.*, except that the flowers



Fig. 217.

are of a deeper orange-colour, spotted with reddish-brown, and the spur is very closely bent back upon the calyx, and slightly notched at the extremity.

A North American plant, which appears to have fully established itself along the Wey, and some other streams in Surrey. *Fl. summer.*

The *Rue* of our gardens (*Ruta graveolens*), and the *Fraxinella* of flower-gardens (*Dictamnus Fraxinella*), both from southern Europe, belong to the very large *Rue* family, chiefly numerous within the tropics, and in the southern hemisphere, but unrepresented in Britain. The *Diosmas*, *Correas*, and many other South African and Australian plants in our plant-houses, are members of the same family.

XXI. THE MAPLE TRIBE. ACERACEÆ.

(A Tribe of the *Sapindus* family, or *Sapindaceæ*.)

The *Maple* tribe corresponds to the Linnæan genus *Acer*, which modern botanists have broken up into two or three, by the separation of a few North American or East Indian species. The whole group consists, however, but of very few species, ranging over the temperate zone of the northern hemisphere.

The true *Sapindaceæ* are mostly tropical trees or lofty climbers, and are seldom to be met with even in our hothouses; but the *Horse-chestnuts* (*Æsculus*, Linn.), so much planted in our parks and grounds, form another group in the same family, or, according to some bota-

nists, the small adjoining family of *Hippocastaneæ*, which, like the *Maple* tribe, contains a small number of trees or shrubs from the northern hemisphere. The *Bladder-nut* of our shrubberies (*Staphylea pinnata*, Eng. Bot. t. 1560), from central and eastern Europe, is the type of a third tribe of *Sapindaceæ*, in which, as in the *Maples* and *Horse-chestnuts*, the leaves are always opposite, whilst in the true *Sapindaceæ* they are generally alternate.

I. MAPLE. ACER.

Trees, with opposite, palmately-veined and lobed leaves, no stipules, and small, greenish flowers, in axillary corymbs or racemes. Sepals usually 5, overlapping each other in the bud, and more or less united at the base. Petals 5, or sometimes 4, or entirely wanting. Stamens about 8, inserted on a thick disk below the ovary. Ovary 2-lobed or rarely 3-lobed, each lobe enclosing one cell with 2 ovules suspended from the inner angle. Styles 2, rarely 3, often united at the base. Fruit separating when ripe into 2, rarely 3, indehiscent carpels or nuts, produced into a wing at the top, and called *keys* or *samaras*. Seeds 1 or 2 in each carpel, without albumen.

A genus not numerous in species, but extending over Europe, Russian and central Asia, and North America. It differs from all British trees, except the *Ash*, by its opposite leaves, and from that genus by the flowers, and by the palmate not pinnate leaves.

Flowers on short, loose, erect corymbs. Wings of the carpels

diverging horizontally 1. *Common M.*

Flowers in pendulous racemes. Wings of the carpels erect,

parallel or slightly diverging 2. *Sycamore M.*

The *A. platanoides* and *A. monspessulanum* from eastern or southern Europe, the *sugar Maple* (*A. saccharatum*), from North America, and some other exotic true Maples, besides the *ash-leaved Maple*, forming the genus *Negundo*, from North America, may be met with in our parks and plantations.

1. Common Maple. *Acer campestre*, Linn. (Fig. 218.)

(Eng. Bot. t. 304.)

When full-grown, a rather handsome, round-headed, though not very tall tree, with a dense, dark-green foliage, but, as it is of slow growth and flowers when young, it is often seen as a small scraggy tree, or mere bush, in our hedges. Leaves on slender stalks, 2 to 3



Fig. 218.

inches broad, divided to about the middle into 5 broad, usually obtuse lobes, entire or sinuate, glabrous above, often downy underneath. Flowers few, on slender pedicels, in loose, erect corymbs, shorter than the leaves. Carpels downy or rarely glabrous, the wings spreading horizontally, so as to form together one straight line.

In European woods, extending eastward to the Caucasus, and northward to southern Sweden. In Britain, abundant in southern England, and apparently truly indigenous as far north as Cheshire and the Tyne. Scarcely indigenous in Ireland. *Fl. spring.*

2. Sycamore Maple. *Acer Pseudo-platanus*, Linn. (Fig. 219.)

(Eng. Bot. t. 303. *Sycamore*.)



Fig. 219.

A much handsomer and freer-growing tree than the *common M.*, the leaves larger, with more pointed and toothed lobes, not unlike those of a *Plane-tree*. Flowers in loose, oblong, hanging racemes. Wings of the carpels nearly parallel, or diverging so as to form a right angle, not spreading into one straight line.

A native of the mountains of central Europe and western Asia, extensively planted in Britain, and in many places sows itself so readily that it may almost be considered as naturalized. *Fl. spring.*

XXII. THE CELASTRUS FAMILY. CELASTRACEÆ.

A rather numerous family, in warm climates of both the new and the old world, and in the southern hemisphere, but confined in Britain to the single genus *Spindle-tree*. The exotic genera associated with it differ chiefly in the shape of the parts of the flowers, or in the various forms the fruit assumes as it ripens.

I. SPINDLE-TREE. EVONYMUS.

Shrubs, with opposite, undivided leaves, and small, green or purplish, regular flowers, in loose, axillary cymes. Calyx small and flat, with 4 or 5 broad, short lobes, overlapping each other in the bud. Petals as many, also overlapping each other. Stamens as many, alternating with the petals, and united with them on a slightly thickened disk, which covers the base of the calyx. Ovary immersed in the disk, with a very short, protruding style. Capsule with 4 (rarely 3 or 5) angles or lobes, enclosing as many cells, and opening, when ripe, in as many valves along the middle of each cell. Seeds solitary in each cell, enclosed in a coloured, fleshy arillus. Embryo in a fleshy albumen.

A genus widely diffused over Europe, Asia, and North America, and easily recognized by its fruit.

1. Common Spindle-tree. *Evonymus europæus*, Linn.
(Fig. 220.)

(Eng. Bot. t. 362. *Spindle-tree*.)

A glabrous shrub, about 3 to 5 feet high. Leaves shortly stalked, ovate-oblong or lanceolate, pointed, and minutely toothed. Peduncles shorter than the leaves, with seldom more than 3 or 5 flowers, of a yellowish-green colour. Petals 4, obovate, about 2 lines long, the stamens half that length. Pod red when ripe, opening at the angles so as to show the seeds enclosed in a brilliant orange-coloured arillus.

In hedges and thickets, in temperate and southern Europe, and western Asia, extending into southern Scandinavia. Frequent in many parts of England and Ireland, but does not reach far into Scotland. *Fl.* spring or early summer.



Fig. 220.

The *E. latifolius*, from the continent of Europe, the *E. atropurpureus*, from North America, and some other exotic species, are occasionally planted in our shrubberies.

XXIII. THE BUCKTHORN FAMILY. RHAMNACEÆ.

An extensive family, widely dispersed over the globe, but confined in Britain to the single genus *Buckthorn*. The exotic genera all agree with that one, and differ from the adjoining families in the position of the stamens, alternating with the sepals, the petals either small and opposite to (or underneath) the stamens, or wanting.

The *Ceanothuses* of our gardens belong to this family. The *Grape Vine*, the *Virginian creeper*, and other species of *Vitis* have the same relative position of the stamens and sepals; but the stamens being more decidedly hypogynous, and the habit different, they form the independent *Vine* family.

I. BUCKTHORN. RHAMNUS.

Shrubs, with alternate undivided leaves, and small green flowers on short pedicels, usually clustered in the axils of the leaves. Calyx with 4 or 5 short, deciduous teeth or sepals. Petals none or very small. Stamens 4 or 5, alternating with the teeth of the calyx and opposite the petals, inserted on a disk which lines the base of the calyx. Ovary free, 3- or 4-celled, with one erect ovule in each cell. Style very short. Fruit a small berry (or drupe) enclosing 3 or 4 small one-seeded nuts. Embryo in a fleshy albumen.

A considerable genus widely spread over the northern hemisphere, both in the new and the old world, penetrating into the tropics, with a few southern species.

Leaves minutely toothed. Branches often thorny. Flowers

dicæous; stamens 4 1. *Common B.*

Leaves entire. No thorns. Flowers hermaphrodite; stamens 5 2. *Alder B.*

The evergreen *Alaternus* of our shrubberies is a species of *Buckthorn* (*R. Alaternus*) from southern Europe.

1. Common Buckthorn. *Rhamnus catharticus*, Linn.

(Fig. 221.)

(Eng. Bot. t. 1629.)

A glabrous shrub with spreading branches, the smaller ones often ending in a stout thorn. Leaves stalked, ovate, acuminate or pointed, rarely obtuse, $1\frac{1}{2}$ to 2 inches long, bordered by very small regular teeth, marked with a few prominent veins, obliquely diverging from the midrib, and mostly proceeding from below the middle. Flowers diœcious, very small, usually thickly clustered in the axils of the leaves. Petals 4, very narrow, and not longer than the teeth of the calyx. Fruit black, about the size of a pea.



Fig. 221.

In hedges and bushy places, extending over Europe, Russian Asia, and northern America, but not an Arctic species. Not abundant in England or Ireland, and very rare in Scotland. *Fl. spring or early summer.*

2. Alder Buckthorn. *Rhamnus Frangula*, Linn. (Fig. 222.)

(Eng. Bot. t. 250, not good.)

A more erect shrub than the *common R.*, not thorny, the leaves broader and more obtuse, entire or slightly sinuate, having sometimes a minute down on the under side, and the lateral veins more numerous, diverging equally from the midrib almost the whole of its length. Flowers 2 or 3 together in each axil, all hermaphrodite; the minute petals, the teeth of the calyx, and the stamens, in fives. Fruit dark-purple, the size of a pea.

In hedges and bushy places, throughout Europe and Russian Asia, except the extreme north. In Britain rather more frequent than the *common R.*, but still rare in Scotland. *Fl. spring or early summer.*



Fig. 222.

The *Sumachs* of our shrubberies (species of *Rhus*) belong to the large family of *Terebinthaceæ*, widely spread over the temperate and hotter regions of the globe, but unrepresented in Britain. They are usually shrubs or trees, with mostly compound leaves, small regular flowers, definite stamens, inserted under a perigynous disk, quite free from the ovary, and no albumen in the seed.

XXIV. THE PEAFLOWER TRIBE. PAPILIONACEÆ.

(A Tribe of the *Leguminous* family, or *Leguminosæ*.)

Herbs, shrubs, or trees; the leaves alternate (or, in a few exotic genera, opposite), usually furnished with stipules, simple or more frequently compound; the leaflets either pinnately or digitately arranged on their common stalk. Flowers in axillary or terminal racemes or spikes, rarely solitary. Sepals combined into a single calyx, more or less divided into 5 or fewer teeth or lobes. Corolla very irregular, consisting of 5 petals; the upper one, called the *standard*, is outside of all in the bud, and usually the broadest; the two lateral ones, called *wings*, are between the standard and the two lower ones, which are inside of all, and united more or less by their outer edge into a single one called the *keel*; the claws of all five petals remaining free. Stamens 10, the filaments in the British species either *monadelphous*, all united in a sheath round the ovary, or *diadelphous*, when the upper one is free and the other 9 united in a sheath. Ovary single, 1-celled, with 1, 2, or more ovules arranged along the inner or upper angle (the one next the standard) of the cavity. Style simple. Fruit a pod, usually opening in 2 valves. Seeds with 2 large cotyledons and no albumen.

A very numerous tribe, widely distributed over the whole surface of the globe, and easily known by the peculiar form and arrangement of the petals, constituting the well-known *peaflower* called by botanists *papilionaceous*, comparing it, by a not very intelligible stretch of imagination, to a butterfly. The whole family comprises two other tribes or suborders, chiefly tropical or southern: the *Casalpinia* tribe, represented in our plantations by the *Judas-tree* (*Cercis*) and the *Gleditschia* or, in our plant-houses, by *Cassias*, *Bauhinias*, and occasionally some

others; and the *Mimosa* tribe, to which belong the *Sensitive-plant* (*Mimosa pudica*), the *Calliandras*, and the numerous Australian *Acacias* of our plant-houses. The *Leguminosæ* thus form, after the *Composites*, the most extensive of all the Natural Orders of flowering plants.

- | | | | |
|----|---|--|--------------------------|
| 1 | { | Leaves simple, or with 3 leaflets | 2 |
| | { | Leaves pinnate, with 2, 4, or more leaflets | 12 |
| 2 | { | Calyx distinctly divided into two lips, either entire, or the upper one 2-toothed and the lower one 3-toothed | 3 |
| | { | Calyx with 5 distinct teeth, not arranged in two lips | 5 |
| 3 | { | Calyx yellow, nearly as long as the petals, deeply divided into two 1. <i>FURZE</i> . | |
| | { | Calyx short, not divided below the middle | 4 |
| 4 | { | Lips of the calyx deeply toothed | 2. <i>GENISTA</i> . |
| | { | Teeth of the lips very short | 3. <i>BROOM</i> . |
| 5 | { | Keel of the corolla very pointed | 6 |
| | { | Keel of the corolla obtuse | 7 |
| 6 | { | Leaves simple, or with 3 leaflets. Flowers solitary or in racemes. Stamens monadelphous | 4. <i>ONONIS</i> . |
| | { | Leaves with a pair of leaflets at the base of the stalk besides the three at the top. Flowers in umbels. Stamens diadelphous | 9. <i>LOTUS</i> . |
| 7 | { | Shrubs or undershrubs. Stamens monadelphous | 2. <i>GENISTA</i> . |
| | { | Herbs. Stamens diadelphous | 8 |
| 8 | { | Leaves simple, or reduced to a tendril | 19. <i>PEA</i> . |
| | { | Leaves with 3 leaflets | 9 |
| 9 | { | Pod much curved or spirally twisted. Flowers in short racemes 5. <i>MEDICK</i> . | |
| | { | Pod straight or nearly so | 10 |
| 10 | { | Flowers in long racemes | 6. <i>MELLOT</i> . |
| | { | Flowers in heads or short racemes | 11 |
| 11 | { | Pod several-seeded, much longer than the calyx | 7. <i>TRIGONEL</i> . |
| | { | Pod 1- to 4-seeded, seldom exceeding the calyx | 8. <i>CLOVER</i> . |
| 12 | { | Flowers in umbels or globular heads | 13 |
| | { | Flowers in spikes or racemes, or solitary | 17 |
| 13 | { | Umbels with a leaf at the top of the peduncle immediately under the flowers | 14 |
| | { | Umbels leafless | 16 |
| 14 | { | Calyx inflated, enclosing the pod | 10. <i>ANTHYLLIS</i> . |
| | { | Calyx not inflated, shorter than the pod | 15 |
| 15 | { | Leaflets 5. Keel pointed or beaked. Pod not jointed | 9. <i>LOTUS</i> . |
| | { | Leaflets many. Keel obtuse. Pod jointed | 14. <i>BIRD'S-FOOT</i> . |
| 16 | { | Keel very pointed | 15. <i>HIPPOCREPIS</i> . |
| | { | Keel small, obtuse. Flowers minute | 13. <i>ARTHROLOBE</i> . |
| 17 | { | Common stalk of all the leaves ending in a terminal leaflet. Stipules not sagittate | 18 |
| | { | Common stalk of the leaves, at least of some of them, ending in a tendril or fine point. Stipules sagittate, or half-sagittate | 20 |
| 18 | { | Pod short, flat with one seed | 16. <i>SAINFOIN</i> . |
| | { | Pod turgid, or elongated, with several seeds | 19 |

- 19 { Keel with a short, distinct point 12. OXYTROPE.
 { Keel obtuse, without any point 11. ASTRAGAL.
- 20 { Style filiform or angular, hairy on the outer side or all round. Leaflets
 { small and numerous (except in the *Bithynian V.*) . . . 17. VETCH.
 { Style flattened, hairy on the inner side only. Leaflets usually few, and
 { rather large 18. PEA.

Among the very numerous *Peaflowers* cultivated in our gardens, and belonging to genera entirely exotic, the most common are, amongst trees,—the *Laburnum* (*Cytisus Laburnum*), the *Robinias* (commonly called *Acacias*, but not the *Acacias* of botanists); among shrubs,—the bladder *Senna* (*Colutea arborescens*), the *Spanish Broom* (*Spartium iunceum*), several species of *Cytisus*, *Caragana*, *Coronilla*, etc.; in flower-gardens,—several *Lupines*, the *French Honeysuckle* (*Hedysarum coronarium*), etc.; and in kitchen-gardens,—the *French Bean* (*Phaseolus vulgaris*), the *Scarlet runner* (*Phaseolus coccineus*), etc.; whilst the Australian *Chorozemas*, *Kennedya*s and others, the New Zealand *Edwardsias* and *Clianthus*, the East Indian *Piptanthus*, *Indigos*, etc., the Chinese *Millettia* (*Wistaria* or *Glycine* of gardeners), and many others, from various parts of the world, are conspicuous in our plant-houses or on garden-walls.

I. **FURZE.** ULEX.

Much branched, very thorny, green shrubs, with simple, prickleshaped leaves, and yellow flowers. Calyx coloured like the petals, divided nearly to the base into two concave segments or lips, which are entire or minutely toothed at the top. Stamens all united into a complete sheath. Pod few-seeded, scarcely longer than the calyx.

A genus of very few species, confined to western and central Europe and north-western Africa.

Calyx very hairy, with the bracts of the base about a line long 1. *Common F.*
 Calyx nearly glabrous, the bracts scarcely perceptible. . . . 2. *Dwarf F.*

1. **Common Furze.** *Ulex europæus*, Linn. (Fig. 223.)

(Eng. Bot. t. 742. *Furze*, *Gorse*, or *Whin*.)

A shrub of 2 to 3 feet, or even twice that height when old and luxuriant, and more or less hairy, especially on the main branches; the numerous short, intricate, small branches all ending in a stout thorn. Lower leaves occasionally lanceolate, but the greater number reduced to thorns, 2 to 6 lines long. Flowers about 6 lines long, solitary in the axils of the leaves on the preceding year's shoots, forming showy

racemes, intermixed with thorns at the end of the branches. Calyx yellow like the petals and but little shorter, clothed with brownish hairs, with a small, broad bract about a line long on each side at the base, besides a similar bract under the short pedicel. Petals narrow.

On heaths and sandy and stony wastes in western Europe, extending eastward to northern and central Germany, but not a Mediterranean species. Abundant in England, Ireland, and southern Scotland, more scarce in the north. *Fl. spring and early summer, commencing occasionally in winter, or even late in autumn.* A double-flowering variety, and another with compact erect branches, commonly called *Irish Furze* (or *U. stricta*), are frequent in gardens.



Fig. 223.

2. Dwarf Furze. *Ulex nanus*, Forst. (Fig. 224.)

(Eng. Bot. t. 743.)

Very near the *common F.*, and perhaps a mere variety. It is of smaller stature, less hairy, and of a deeper green; the flowers of a deeper golden-yellow, and smaller; the calyx glabrous, or with only a few short, scattered hairs, and the bracts at its base very much smaller, sometimes quite microscopic.

On heaths and sandy or stony wastes, more strictly western than the *common F.*, as it does not cross the Rhine, but often intermixed with that species. Very abundant in Britain. *Fl. summer and autumn, whilst the common F. is in fruit.* There are two forms, sometimes very distinct, at others running much one into the other; one, the original *U. nanus*, found chiefly in the plains of eastern England, is very dwarf or procumbent,



Fig. 224.

with the calyx about 4 lines long; the other, under the name of *U. gallica*, is more erect, with the calyx about 5 lines long, and is more frequent in western England, often covering large tracts in the Welsh mountains.

II. GENISTA. GENISTA.

Low branching green shrubs or undershrubs, with single (or in some exotic species trifoliolate) leaves and yellow flowers. Calyx with 5 teeth, the 2 upper ones much longer than the 3 lower. Standard oblong, keel reflexed after flowering. Stamens all united in a complete sheath. Stigma oblique. Pod longer than the calyx, with several seeds.

A numerous genus chiefly in the Mediterranean region and western Asia, the few British species easily distinguished by their foliage and the shape of the petals. Many exotic species, however, present so much variety, that the general circumscription of the genus, and its distinction from *Cytisus* and other allied genera, are as yet far from being settled.

No thorns. Pod narrow, much flattened.

Corolla and pods without hairs. Branches erect or ascending 1. *Dyer's G.*

Corolla and pods hairy. Branches mostly prostrate . . . 2. *Hairy G.*

Lower branches very thorny. Pod short and inflated . . . 3. *Needle G.*

1. *Dyer's Genista. Genista tinctoria*, Linn. (Fig. 225.)

(Eng. Bot. t. 44. *Greenweed*.)

Stems woody, branching and decumbent at the base, the flowering branches erect or ascending, 1 to 1½ feet high, hard and stiff, but green. Leaves sessile, from narrow-lanceolate to broadly elliptical or nearly ovate, glabrous or nearly so, and often shining. Flowers in short racemes at the ends of the branches, each one shortly stalked in the axil of a lanceolate bract, with very small bracteoles below the flowers. Calyx short, all the teeth ending in a short, fine point, the upper 2 broadly lanceolate, the 3 lower very narrow. Petals about 6 lines long. Pod nearly an inch long, flattened, and quite glabrous.

In pastures, thickets, and waste places throughout central and southern Europe, across Russian Asia to the Baikal, and northward to southern Sweden. Frequent in the greater part of England, rare

in Scotland and Ireland. *Fl. summer, rather early.* The common form is erect, with lanceolate leaves; in rich meadows it becomes very luxuriant, with ovate leaves; in dry rocky soils the stem is more branched, and almost prostrate, like the *hairy G.*, from which it is always known by its more pointed leaves, and glabrous flowers and pods.



Fig. 225.

2. Hairy Genista. *Genista pilosa*, Linn (Fig. 226.)

(Eng. Bot. t. 208.)

Stems woody and prostrate, with numerous short, hard branches. Leaves shortly obovate or lanceolate, obtuse, glabrous above, but covered underneath with short, silky hairs. Flowers smaller than in the *Dyer's G.*, of a bright yellow, on short pedicels in the axils of the last year's leaves. Calyx silky. Petals also covered outside with silky hairs. Pod rather shorter and broader than in the *Dyer's G.*, thickly covered with longish hairs, which are appressed and silky when young, more spreading as the pod ripens.

In pastures, heaths, and dry, gravelly or stony places, common in central and southern Europe to the Caucasus, extending northward to southern Sweden. Rare in Britain, and only recorded from Pembrokeshire, Cornwall, and Devonshire, in the west, and Sussex and Suffolk, in the east of England. *Fl. spring or early summer.*



Fig. 226.

3. Needle Genista. *Genista anglica*, Linn. (Fig. 227.)(Eng. Bot. t. 132. *Petty Whin*.)

Fig. 227.

A small, loosely branched, spreading shrub, seldom a foot high, perfectly glabrous, the lower branches converted into short, but slender, simple or branched thorns. Leaves small, lanceolate or ovate. Flowers few, in short, leafy racemes, paler and smaller than in the *Dyer's G.*; the teeth of the calyx less unequal; the petals narrow, and often turning green in drying. Pods about 6 lines long, broad, and much inflated.

On heaths, moors, and bushy pastures, in western Europe, extending eastward to Denmark and north-western Germany. Frequent in England and the greater part of Scotland, but not recorded from Ireland. *Fl. spring and early summer, and sometimes again later in the year.*

III. **BROOM.** SAROTHAMNUS.

Shrubs, with stiff, green branches, the leaves mostly with 3 digitate leaflets. Calyx campanulate, with 2 short, broad lips, minutely toothed at the top. Petals broad, the keel obtuse and slightly incurved. Stamens all united into a complete sheath. Style very long and spirally incurved. Pod flat, much longer than the calyx, with many seeds.

A genus of very few species, chiefly from western Europe, separated by rather slight characters from the exotic genus *Cytisus*, but now generally adopted.

1. Common Broom. *Sarothamnus scoparius*, Wimm.

(Fig. 228.)

(*Spartium*, Eng. Bot. t. 1339.)

A shrub, of 3 to 5 feet, glabrous or nearly so, with numerous long, straight and erect, green, wiry branches prominently angled. Lower leaves shortly stalked, with 3 small, obovate leaflets; the upper leaves sessile;

the leaflets often reduced to a single one. Flowers large, bright yellow solitary or in pairs, on slender pedicels, in the axils of the old leaves, forming handsome leafy racemes along the upper branches. Petals all broad, the standard broadly orbicular, the keel often deflected as in *Genista*. Pod $1\frac{1}{2}$ to 2 inches long, flat, hairy on the edges, but glabrous on the sides, the seeds attached to a line considerably within the edge of the pod.

On dry, hilly wastes and bushy places, chiefly in western Europe, but extending more sparingly to its eastern limits, and northward into southern Sweden. Common in England, Ireland, and the greater part of Scotland. *Fl. spring and early summer.*

The *Irish Broom* of our gardens is the *S. patens* from Portugal, not a native of Ireland. The *Spanish Broom* belongs to the genus *Spartium*. Other shrubs called *Brooms* in our gardens are species of *Cytisus*.

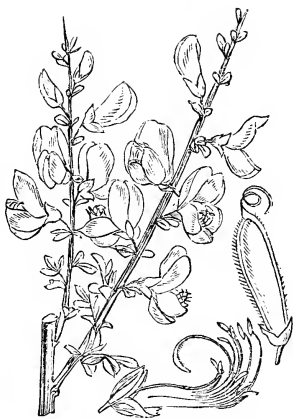


Fig. 228.

IV. ONONIS. ONONIS.

Herbs or low undershrubs, with pinnately trifoliate, or rarely simple leaves; the leaflets generally toothed; the stipules leafy, adhering to the leafstalk; the flowers solitary, on axillary peduncles, often forming terminal leafy racemes. Calyx with 5 narrow segments. Standard large and striate. Keel terminating in a pointed beak. Stamens all united in a sheath. Pod inflated, with few seeds.

A rather numerous genus, chiefly from the Mediterranean region, and not extending far into Asia. The denticulate leaves are like those of the *Clover* group, whilst the stamens are monadelphous, as in *Genista* and its allies.

Much branched perennial or undershrub, often thorny . . . 1. *Restharrow O.*
 Small, erect annual 2. *Small O.*

1. *Restharrow Ononis.* *Ononis arvensis*, Linn. (Fig. 229.)

(Eng. Bot. t. 682, and Suppl. t. 2659. *O. campestris*, Bab. Man.)

Very variable in aspect, generally a low, spreading, much branched undershrub, often rooting at the base or creeping underground, some-



Fig. 229.

times nearly erect, a foot high or more, rarely glabrous, usually thinly clothed with soft spreading hairs, and more or less glutinous; the hairs either covering the branches all round or entirely in two opposite lines; in dry situations many of the small branches end in a thorn. Leaflets obovate or oblong, the lateral ones smaller or sometimes wanting. Flowers sessile or shortly stalked, solitary, on short branches, or forming short, leafy racemes. Flowers pink, the standard streaked with a deeper shade. Pod shorter or rather longer than the calyx, with 2 or 3 seeds.

In barren pastures and poor ill-cultivated fields, throughout Europe and central and Russian Asia, except the extreme north. Common in Britain. *Fl.* summer and autumn. A glabrous, more erect, and thorny variety is often admitted as a species, under the name of *O. antiquorum* or *O. campestris*. It is more common in the south of Europe than in Britain.

2. Small Ononis. *Ononis reclinata*, Linn. (Fig. 230.)

(Eng. Bot. Suppl. t. 2838.)



Fig. 230.

An erect annual, 3 or 4 inches high, slightly hairy, and often viscid, the lateral branches decumbent at the base. Leaflets small, varying from broadly obovate to very narrow. Flowers small, pale pink, hanging from short erect pedicels, forming short, terminal, leafy racemes. Petals scarcely exceeding the calyx, or shorter. Pod rather smaller, containing 10 or 12 seeds.

On sands and dry banks near the sea, very common round the Mediterranean, and here and there on the shores of the Atlantic, up to the Channel Islands, and again near the Mull of Galloway, on the south-west coast of Scotland. *Fl.* early summer.

V. **MEDICK.** MEDICAGO.

Herbs (with one exotic shrubby species), with leaves pinnately trifoliate; the leaflets usually toothed; the leafy stipules adhering to the leafstalks; the flowers small, in short spikes or loose heads, on axillary peduncles. Calyx 5-toothed. Keel obtuse. Stamens diadelphous, the upper one entirely free. Pod small, with few seeds, very much curved or spirally twisted, and indehiscent.

A rather numerous genus in the Mediterranean region and a portion of central Asia, with a few species extending as weeds over a great portion of the globe. To determine the annual species it is absolutely necessary to have the fruit, as some cannot be distinguished by any other character.

Perennials, with conspicuous purple or pale yellow flowers.

Stems mostly erect. Flower purple. Pod forming 2 or

3 spires 2. *Lucern M.*

Stems decumbent. Flower pale yellow. Pod not forming

a complete spire 1. *Sickle M.*

Annuals, with very small, bright yellow flowers.

Pod small, 1-seeded, not forming a complete spire . . . 3. *Black M.*

Pod several-seeded, spirally twisted, edged with prickles.

Plant downy. Stipules nearly entire 6. *Bur M.*

Plant nearly glabrous. Stipules finely toothed.

Pod nearly globular, of 3 or 4 spires, furrowed at

the edge between the prickles 5. *Spotted M.*

Pod of 2 or 3 flat loose, strongly-veined spires, not

furrowed at the edge 4. *Denticulate M.*

The shrubby *M. arborea*, and one or two annual species from southern Europe, have been occasionally cultivated in gardens as curiosities, especially the so-called *Snail-plant* (*M. scutellata*).

1. **Sickle Medick.** *Medicago falcata*, Linn. (Fig. 231.)

(Eng. Bot. t. 1016. *M. sylvestris*, Bab. Man.)

Stock perennial, with decumbent or rarely erect stems 1 to 2 feet long. Stipules narrow and entire. Leaflets obovate-oblong or nearly linear. Peduncles axillary, bearing at their extremity a short, close raceme of flowers, rather large for the genus, usually yellow, but sometimes passing into blue or violet. Pod much longer than the calyx, flat, more or less curved, but never forming more than one complete ring. Seeds 2 or 3.

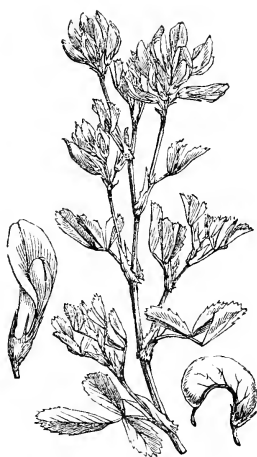


Fig. 231.

On dry banks and open places in central and southern Europe, and central Asia, extending eastward to the Baikal and northward to Sweden. In Britain confined to southern and eastern England, and rare even there; quoted also from Ireland, but as scarcely indigenous. *Fl. summer.*

2. Lucern Medick. *Medicago sativa*, Linn. (Fig. 232.)

(Eng. Bot. t. 1749. *Lucern*.)



Fig. 232.

Much like the *sickle M.*, and perhaps only a variety produced by cultivation. It is usually more erect, the flowers are almost always violet or blue, and the pod is spirally twisted so as to form two, or sometimes three, complete rings or coils.

Apparently of south-eastern origin, but so generally cultivated, that no station is known for it where it may not have escaped from cultivation. In Britain, certainly introduced only, on the borders of fields, and in pastures. *Fl. summer.*

3. Black Medick. *Medicago lupulina*, Linn. (Fig. 233.)

(Eng. Bot. t. 971. *Nonsuch*.)

An annual, branching at the base into spreading stems 1 to 2 feet long, and more or less clothed with short, soft hairs. Stipules broad and shortly toothed. Leaflets obovate. Peduncles longer than the leaves, bearing a compact raceme or oblong head of very small bright-yellow flowers. Pods small, black when ripe, glabrous or slightly hairy, kidney-shaped, but marked with veins curved almost into a complete spire, containing a single seed.

In pastures and waste places, throughout Europe and central and Russian Asia, except the extreme north, and often cultivated among "artificial grasses." Frequent in Britain, excepting northern Scotland. *Fl. the whole season.*



Fig. 233.

4. Denticulate Medick. *Medicago denticulata*, Willd.

(Fig. 234.)

(Eng. Bot. Suppl. t. 2634.)

An annual, branching at the base into spreading stems from a few inches to above a foot long, glabrous, or with a very few appressed hairs. Stipules bordered with fine teeth. Leaflets obovate or obcordate. Flowers very small, in little heads, on peduncles rather longer than the leaflets. Pod spirally twisted, formed of 2 or 3 loose, flat coils, elegantly veined on the surface, and usually edged with two rows of more or less hooked or curved prickles, but not furrowed between them.

In cultivated and waste places, especially near the sea, very abundant in the Mediterranean region and west central Asia, and carried out with cultiva-



Fig. 234.

tion to many parts of the world. In Britain it appears to have established itself in some of the southern and eastern counties of England. *Fl. spring and summer.* A variety with smaller pods, with the prickles exceedingly short and not hooked, has been sometimes considered as a species under the name of *M. apiculata*.

5. Spotted Medick. *Medicago maculata*, Willd. (Fig. 235.)

(*M. polymorpha*, Eng. Bot. t. 1616.)



Fig. 235.

An almost glabrous annual, so like the last in foliage, stipules, and flowers, that, without the fruit, it can be scarcely distinguished but by a few spreading hairs on the leaf-stalks, visible when held up against the light. It is often also more luxuriant, the leaflets have usually a dark spot in the centre, and the flowers fewer in the raceme. The pod has 3 or 4 spires, much more compact than in the *denticulate M.*, giving the whole pod a more globular form, the surface is less veined, and the edge thicker, more or less furrowed between the prickles, which are finer and more curved.

In cultivated and waste places, in western and southern Europe to the Caucasus, rarely extending into Germany. Not uncommon in central and southern England, also in southern Ireland. *Fl. spring and summer.*

6. Bur Medick. *Medicago minima*, Linn. (Fig. 236.)

(Eng. Bot. Suppl. t. 2635.)

An annual, like the last two, but usually smaller and more compact, and clothed with short, soft hairs or down. Stipules entire or very shortly toothed. Flowers few, minute, on short peduncles. Pod smaller than in the last two species, nearly globular, of 2, 3, or 4 compact spires edged each with a double row of hooked prickles.

In open pastures and waste places, widely spread over Europe and western Asia, extending northwards to southern Sweden. Rare in Britain, and only in some of the southern and eastern counties of England. *Fl. spring and summer.* Like other species, it varies much in the size of the pods and the length of the prickles: in Britain they are usually small.



Fig. 236.

VI. MELILOT. MELILOTUS.

Herbs with leaves pinnately trifoliate, the leaflets usually toothed, the stipules slightly adhering to the leafstalks, and small yellow or white flowers, in long, loose racemes on axillary peduncles. Calyx five-toothed. Petals falling off after fading, the keel obtuse. Stamens diadelphous, the upper one entirely free. Pod of one or very few seeds, straight, thick, small, but longer than the calyx, and indehiscent.

A genus of few species, all south European or west Asiatic, but some spreading over most parts of the world. They were formerly united with *Clover*, but their inflorescence gives them a very different aspect. From *Trigonel* they differ chiefly in the short, thick pod, usually with only 1 or 2 seeds.

Flowers white 3. *White M.*

Flowers yellow.

Pod irregularly net-veined and wrinkled. Stem usually 2

or 3 feet high 1. *Common M.*

Pod transversely wrinkled. Stem usually under 2 feet

high 2. *Field M.*

1. Common Melilot. *Melilotus officinalis*, Linn. (Fig. 237.)

(*Trifolium*, Eng. Bot. t. 1340.)

An annual or biennial, usually erect, 2, 3, or even 4 feet high, branched and glabrous; the leaves usually distant, on long leafstalks. Stipules



Fig. 237.

narrow. Leaflets of the lower leaves obovate, nearly orbicular, those of the upper ones narrower, often linear. Flowers numerous, 2 or 3 lines long, of a bright yellow, in long, axillary racemes. Pod oval, about 2 lines long, obtuse or pointed, marked with irregularly netted veins.

On roadsides, banks and bushy places throughout Europe and central and Russian Asia, except the extreme north. Not frequent in Britain, and only as an introduced plant, excepting in southern England, and perhaps Ireland. *Fl. summer.*

2. Field Melilot. *Melilotus arvensis*, Willd. (Fig. 238.)

(Eng. Bot. Suppl. t. 2960.)



Fig. 238.

Very near the *common M.*, and perhaps a mere variety. It is usually smaller, seldom attaining two feet, the leaflets rather broader, and the racemes looser, with fewer flowers, but the only positive distinction is in the fruit, which is smaller, more like that of the *white M.*, and marked with transverse wrinkles. In flower only it is often impossible to distinguish it from the *common M.*

In cultivated and waste places, in central and southern Europe. In Britain, only observed in some of the eastern counties of England. *Fl. summer.* The species requires further investigation.

3. White Melilot. *Melilotus alba*, Lam. (Fig. 239.)

(*M. leucantha*, Eng. Bot. Suppl. t. 2689. *M. vulgaris*, Brit. Fl.)

Very like the *common M.*, but usually of taller growth and longer duration, with a harder, more wiry stem, and narrower leaflets, and the flowers always white. Pod variable, but usually smaller and more obtuse than in the *common M.*, with the transverse wrinkles of the *field M.*

As widely spread as the *common M.* over Continental Europe and Asia, and more abundant in the south, where it becomes a troublesome weed in fields and vineyards. Occasionally found in many parts of England, Ireland, and Scotland, but probably introduced with corn or ballast. *Fl.* rather late in summer.



Fig. 239.

VII. **TRIGONEL.** TRIGONELLA.

Herbs, with the habit and most of the characters of *Medick*, but differing from that genus by the straight or but slightly curved pod, and from *Clover* by the pod much longer than the calyx, opening in two valves.

The true *Trigonels* or *Fenugreeks* are all exotic, and widely spread over southern Europe, Asia, and Australia. The only British species is sometimes anomalous, approaching in many respects to *Clover*, with which it was associated by the older botanists, and recently proposed as a distinct genus under the name of *Aporanthes*. It requires further comparison with some exotic species, as yet but little known, before the question can be decided.

1. Bird's-foot Trigonel. *Trigonella ornithopodioides*, DC. (Fig. 240.)

(*Trifolium*, Eng. Bot. t. 1047.)

A little annual, with thickly matted spreading stems, rarely more than 2 or 3 inches long, and usually glabrous. Leaflets inserted close



Fig. 240.

together at the summit of the stalk, obovate or obcordate, and toothed. Flowers small, nearly white, solitary or 2 or 3 together in each axil, the lower ones nearly sessile, the upper ones on stalks of 2 to 4 or even 5 lines long. Calyx-teeth slender. Petals remaining round the pod, as in *Clover*. Pod slightly curved, glabrous, containing 6 to 8 seeds.

In dry sandy pastures, chiefly near the sea, in western and southern Europe, extending northward to Denmark. In several maritime counties of England, Ireland, and southern Scotland. *Fl. early summer*.

VIII. CLOVER. TRIFOLIUM.

Herbs, with stipules adhering to the leafstalks. Leaves pinnately or almost digitately trifoliate; the leaflets often toothed. Flowers red, white, or yellow, in close heads. Calyx 5-toothed. Petals narrow, often connected together by the claws, and usually remaining round the pod after fading. Stamens diadelphous, the upper one entirely free. Pod scarcely protruding beyond the calyx, containing from 1 to 4 seeds, and usually indehiscent.

A very widely spread and numerous genus in the northern hemisphere, both in the new and the old world, deficient in several tropical regions, but reappearing in southern America and Africa. It is readily distinguished from the *Medicks* and *Trigonels* by the pod, from the *Melilots* by the compact heads of flowers.

- | | | | |
|---|---|---|-----------------------|
| 1 | { | Heads of flowers pedunculate in the axils of the leaves, or above the last leaves of the stem | 2 |
| | | Heads of flowers closely sessile in the axils, or within the last leaves of the stem | 14 |
| 2 | { | Flowers yellow, reflexed and brown when faded | 3 |
| | | Flowers red, white, or cream-coloured | 5 |
| 3 | { | Flowers 30 to 40, in a compact head. Standard distinctly furrowed when faded | 18. <i>Hop C.</i> |
| | | Flowers not more than 20 in the head. Standard scarcely striate . . . | 4 |
| 4 | { | Flowers usually 10 to 20 in the head, sessile or on very short pedicels. | 19. <i>Lesser C.</i> |
| | | Flowers 2 or 3, rarely 5 or 6 in the head. Pedicels as long as the calyx-tube | 20. <i>Slender C.</i> |

- | | | | |
|----|---|--|----------------------------|
| 5 | { | Stem creeping, and rooting at the nodes, or closely prostrate | 6 |
| | | Stem ascending or erect | 8 |
| 6 | { | Flowers pedicellate in the head, reflexed after fading | 17. <i>White C.</i> |
| | | Flowers sessile, erect | 7 |
| | | Heads globular. Flowers small. Calyx much inflated after flowering. | |
| | | | 16. <i>Strawberry C.</i> |
| 7 | { | Heads of few rather large flowers. Peduncles turned down into the ground after flowering | 15. <i>Subterranean C.</i> |
| 8 | { | Heads oblong or cylindrical when fully out | 9 |
| | | Heads ovoid or globular | 10 |
| 9 | { | Corolla small, shorter than the long, fine calyx-teeth | 2. <i>Hare's-foot C.</i> |
| | | Corolla showy. Standard longer than the calyx-teeth | 1. <i>Crimson C.</i> |
| 10 | { | Corolla small, 1 to 3 lines long | 11 |
| | | Corolla showy, 5 to 6 lines long or more | 12 |
| | | Calyx-teeth short, lanceolate, slightly ciliate | 7. <i>Sea C.</i> |
| | | Calyx-teeth short, subulate, glabrous | 11. <i>Upright C.</i> |
| 11 | { | Calyx softly hairy, the teeth longer than the corolla, spreading after flowering | 3. <i>Starry C.</i> |
| | | Calyx inflated after flowering. Standard turned outwards | 14. <i>Reversed C.</i> |
| 12 | { | Annual. Teeth of the calyx nearly equal | 1. <i>Crimson C.</i> |
| | | Perennials. Lower tooth of the calyx longer than the others | 13 |
| 13 | { | Flowers red | 6. <i>Zigzag C.</i> |
| | | Flowers cream-coloured | 4. <i>Sulphur C.</i> |
| 14 | { | Corolla showy, 6 lines long or more | 15 |
| | | Corolla small, 1 to 3 lines. | 16 |
| 15 | { | Flowers red | 5. <i>Purple C.</i> |
| | | Flowers cream-coloured | 4. <i>Sulphur C.</i> |
| | | Heads globular. Calyx glabrous, with short recurved teeth | 17 |
| 16 | { | Heads ovoid or oblong when fully out. Calyx more or less hairy, with rigid, erect or spreading teeth | 18 |
| | | Heads crowded at the base of the very short prostrate stems | |
| | | | 13. <i>Suffocated C.</i> |
| 17 | { | Heads distinct or distant along the branches | 12. <i>Clustered C.</i> |
| 18 | { | Calyx-teeth rigid and spreading after flowering, almost lanceolate | 19 |
| | | Calyx-teeth shortly subulate, erect or slightly spreading | 20 |
| 19 | { | Stems ascending or erect, a foot high or more | 7. <i>Sea C.</i> |
| | | Stems spreading, seldom above 6 inches | 10. <i>Rough C.</i> |
| | | Leaflets obovate. Upper stipules very broad | 8. <i>Knotted C.</i> |
| 20 | { | Leaflets narrow-oblong or linear. Stipules narrow. Stem erect. | |
| | | | 9. <i>Boccone's C.</i> |

The *Alsike clover* (*T. hybridum*), a species allied to the *white C.*, but with ascending not creeping stems, and more pink in the flowers, is now frequently cultivated for forage, but does not appear to have as yet become naturalized, although common in northern and central continental Europe.

1. **Crimson Clover.** *Trifolium incarnatum*, Linn.

(Fig. 241.)

(Eng. Bot. Suppl. t. 2950.)



Fig. 241.

A softly hairy annual, erect or nearly so, often slender and starved-looking when wild, with ovoid or shortly oblong terminal flower-heads; but in rich soils, or when cultivated, attaining $1\frac{1}{2}$ to 2 feet in height, with oblong or cylindrical flower-heads sometimes 2 inches long. Stipules broad and membranous. Leaflets very broadly obovate or obcordate. Calyx softly hairy, with narrow pointed teeth nearly equal in length. Corolla of a rich crimson, or of a pale cream-colour, 4 to 6 lines long.

In open places, especially near the sea, in southern Europe, and, having been long cultivated for fodder, has become naturalized in various parts of central and even northern Europe. In Britain, the pale yellow variety, the most common in a truly wild state on the Continent, ap-

pears to be indigenous on the coast of Cornwall, near the Lizard Point; the cultivated crimson variety has only established itself in a few places in southern England. *Fl. summer.*

2. **Hare's-foot Clover.** *Trifolium arvense*, Linn. (Fig. 242.)

(Eng. Bot. t. 944.)

A slender, branching, erect annual, seldom reaching a foot in height, and clothed with short soft hairs. Stipules and leaflets narrow. Flowers small, in pedunculate heads, which are at first nearly globular but soon become oblong or cylindrical, 6 to 9 lines long, appearing very soft and feathery owing to the fine hairy teeth of the calyx projecting beyond the very small corolla.

In cornfields, dry pastures, on sandy banks, etc., throughout Europe and western Asia, except the extreme north. Abundant in Britain, but more in the south than in the north. *Fl. summer and autumn.*



Fig. 242.

3. **Starry Clover.** *Trifolium stellatum*, Linn. (Fig. 243.)

(Eng. Bot. t. 1545.)

A low but rather coarse annual, covered with soft hairs, and seldom above 6 inches high. Leaves broadly obovate or obcordate. Flower-heads globular, softly hairy, on rather long peduncles above the last leaves. Calyx remarkable for the long subulate-lanceolate teeth, spreading like a star after flowering, whilst the mouth is closed over the pod by a tuft of hairs. Corolla shorter than the calyx-teeth, of a pale cream-colour.

In dry pastures and waste places, in southern Europe, common round the Mediterranean, reappearing in south-western France, and in Britain, on the coast of Sussex near Shoreham, and perhaps in a few other localities, introduced with ballast. *Fl. early summer, and sometimes again in autumn.*



Fig. 243.

4. Sulphur Clover. *Trifolium ochroleucum*, Linn.
(Fig. 244.)

(Eng. Bot. t. 1224.)



Fig. 244.

A perennial, with the habit and foliage, as well as the inflorescence of the *purple C.*, and the same-sized flowers, but the leaflets are usually rather narrower, the flower-heads more ovoid, and the flowers cream-coloured, with rather shorter teeth to the calyx, the lowest tooth twice as long as the others.

In pastures, dry meadows, and open woods, in central and southern Europe to the Caucasus, but not crossing the Baltic. In Britain, confined to a few of the eastern counties of England. *Fl. summer.*

5. Purple Clover. *Trifolium pratense*, Linn. (Fig. 245.)

(Eng. Bot. t. 1770.)



Fig. 245.

Stock usually perennial, but of few years' duration. Stems decumbent or nearly erect, 1 to 2 feet long, and hairy. Stipules rather large, ovate, veined, with long green points. Leaflets obovate or obcordate. Flowers of a reddish-purple, about 6 lines long, in dense terminal, ovoid, or globular heads, with 2 sessile, trifoliate leaves close at their base, or very rarely the heads are shortly stalked above them. Calyx-teeth subulate and hairy, the lowest longer than the others. After flowering, the petals turn brown, the calyx remains erect, enclosing the pod, which has usually a single seed.

In meadows and pastures, throughout Europe and central and northern Asia, from the Mediterranean to the Arctic Circle, ascending high up into mountain

regions. It has however been so long cultivated, that in some localities it may not be truly indigenous. Abundant in Britain. *Fl. the whole summer.*

6. Zigzag Clover. *Trifolium medium*, Linn. (Fig. 246.)

(Eng. Bot. t. 190.)

Very much resembles the *purple C.*, and may be a mere variety. It is a handsomer plant, with narrower stipules and leaflets; the heads of flowers are always more or less pedunculate above the last floral leaves, and the corolla rather larger, of a brighter and richer colour. The zigzag stem is not a very constant differential character, and even the pedunculate flower-heads may be occasionally observed also in the *purple C.*



Fig. 246.

In open woods, bushy pastures, on banks and roadsides, in northern and central Europe, and across Russian Asia, becoming a mountain plant in southern Europe. Generally spread over Britain, but more common in southern Scotland and northern England than further north or south; extends also into Ireland. *Fl. summer.*

7. Sea Clover. *Trifolium maritimum*, Huds. (Fig. 247.)

(Eng. Bot. t. 220.)

An annual, with spreading or decumbent stems, seldom above a foot high, and more slender than the last three, with much smaller flowers. Stipules long and narrow. Leaflets narrow-obovate or oblong. Flower-heads at first globular, then ovoid, shortly pedunculate above the last leaves. Calyx-teeth at first subulate, the lower one longer than the others, but all much shorter than in the *purple C.*, and after flowering they are somewhat enlarged, stiff, and slightly



Fig. 247.

spreading. Corolla pale-pink, rather longer than the calyx.

In salt-marshes and rich meadows near the sea, in southern and western Europe, rarely extending along great rivers. In Britain, confined to southern England and Ireland. *Fl. summer, rather early.*

8. **Knotted Clover.** *Trifolium striatum*, Linn. (Fig. 248.)

(Eng. Bot. t. 1843.)



Fig. 248.

A small, tufted, more or less spreading annual, covered with short, soft hairs. Stipules ovate, ending in a fine point. Leaflets obovate. Flower-heads small, ovoid or globular, chiefly terminal, and closely sessile within the last leaves, of which the stipules are very broad and thin, with occasionally one or two heads sessile in the axils of the upper leaves. Calyx softly hairy, with short but subulate teeth, which remain erect after flowering. Corolla very small and pale-red.

In dry pastures, on banks and waste places, in central and southern Europe to the Caucasus, extending northward into southern Sweden. Diffused over nearly the whole of England, Ireland, and southern Scotland. *Fl. all summer,*

9. **Boccone's Clover.** *Trifolium Bocconi*, Savi. (Fig. 249.)

(Eng. Bot. Suppl. t. 2868.)

Very near the *knotted C.*, but the stems are erect or nearly so, 2 to 6

inches high; the stipules narrower; the leaflets narrow-oblong, spathulate, or nearly linear; the flower-heads more oblong, usually two together at the summit of the stem, and sometimes one or two besides, on short, lateral branches. Flowers much like those of the *knotted C.*, of a very pale colour, the calyx rather less hairy.

In dry pastures and waste places, in southern Europe, and here and there up western France. In Britain only on the Cornwall coast, near the Lizard Point. *Fl. summer.*



Fig. 249.

10. **Rough Clover.** *Trifolium scabrum*, Linn. (Fig. 250.)

(Eng. Bot. t. 903.)

Very near the *knotted C.*, and not always easy to distinguish from it. Usually more procumbent and less hairy, the leaflets not so broad, the flower-heads more in the axils of the leaves, and the stipules of the floral leaves less prominent; but the chief distinction lies in the calyx, of which the teeth are broader, more rigid, and usually spreading or recurved after flowering, giving the plant a stiffer appearance. Flowers small and whitish.

In dry pastures and waste places, in central and southern Europe to the Caucasus, scarcely extending into northern Germany. In Britain, chiefly near the sea, in England, Ireland, and southern Scotland, but less common than the *knotted C.* *Fl. all summer.*



Fig. 250.

11. **Upright Clover.** *Trifolium strictum*, Linn. (Fig. 251.)

(Eng. Bot. Suppl. t. 2949.)

An erect annual, seldom 6 inches high, and perfectly glabrous. Stipules very broad and thin. Leaflets narrow. Flower-heads solitary, or two or three on each stem, pedunculate above the last leaves, small



Fig. 251.

and globular. Flowers very small. Calyx campanulate, the teeth subulate, quite glabrous, and about the length of the corolla. Pod ovoid, generally 1-seeded, projecting from the calyx.

In dry pastures and waste places, scattered over central and southern Europe, from the Atlantic to Transylvania. In Britain, confined to the Channel Islands and the Cornwall coast about the Lizard Point. *Fl. early summer.*

12. Clustered Clover. *Trifolium glomeratum*, Linn.

(Fig. 252.)

(Eng. Bot. t. 1063.)



Fig. 252.

A small, slender, spreading annual, glabrous or nearly so. Stipules short, with a subulate point. Leaflets broadly obovate. Flower-heads small, globular, closely sessile in the axils of the leaves or at the ends of the branches. Calyx-teeth short, broad, very pointed, and rigidly recurved as the pod ripens. Corolla of a bright pink, very small, although longer than the calyx-teeth.

On dry heaths, pastures, and waste places, very abundant in southern Europe to the Caucasus, and extending more sparingly along western France to the southern and eastern counties of England. *Fl. early summer.*

13. Suffocated Clover. *Trifolium suffocatum*, Linn.

(Fig. 253.)

(Eng. Bot. t. 1049.)

A very small tufted annual, with procumbent stems often scarcely developed, and seldom more than 2, or at most 3, inches long. Leaflets glabrous, obovate, on long slender footstalks. Flowers small,

closely sessile, in little dense heads, crowded along the short stems, close to the ground. Calyx thin, with fine recurved teeth; the corolla very minute.

In dry pastures and sandy or gravelly places, especially near the sea, in southern Europe to the Caucasus, extending up western France to the shores of the Channel. Rare in England, on the southern coasts, extending eastward up to Norfolk, and westward to Anglesea; not recorded from Ireland, but perhaps overlooked from its small size. *Fl.* spring or early summer.

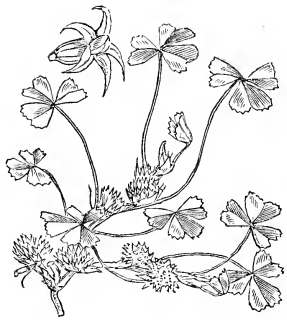


Fig. 253.

14. Reversed Clover. *Trifolium resupinatum*, Linn.

(Fig. 254.)

(Eng. Bot. Suppl. 2789, *not good*.)

A glabrous annual, with numerous stems, leafy and tufted at the base, lengthened out to a foot or more. Stipules rather broad, with narrow points. Flower-heads small, on short axillary peduncles. Calyx glabrous or hairy on the upper side only, the teeth short, but after flowering the upper part becomes very much inflated, arched; membranous and veined, with the 2 upper teeth at the top, the 3 lower ones remaining at the base of the inflated part. Corolla small, pink, the standard turned outwards instead of inwards as in other *Clovers*.

In meadows and pastures, especially near the sea, in southern Europe to the Caucasus, and up western France to the shores of the Channel. Not indigenous in Britain, but has occasionally appeared in some of the southern counties of England. *Fl.* spring and early summer.



Fig. 254.

15. Subterranean Clover. *Trifolium subterraneum*, Linn.
(Fig. 255.)

(Eng. Bot. t. 1048.)



Fig. 255.

A small, prostrate annual, more or less clothed with long spreading hairs; the stems usually short and tufted, but occasionally lengthened out to 6 or 8 inches. Stipules broad. Leaflets obovate, on long leafstalks. Flowers white or pale-pink, long in proportion to the plant, 2 or 3 together on axillary peduncles, which lengthen considerably after flowering, and turn down almost into the the ground; the fruiting calyx then turns back upon the peduncle, and is usually surrounded by short thick fibres, each with 5 spreading, subulate teeth, showing that they are, in fact, undeveloped calyxes.

In dry, gravelly or sandy pastures, common in southern Europe to the Caucasus, and up western France to the Channel. Abundant in many parts of southern and central England, but not in the north, nor in Scotland, nor as yet recorded from Ireland. *Fl. spring and early summer.*

16. Strawberry Clover. *Trifolium fragiferum*, Linn.
(Fig. 256.)

(Eng. Bot. t. 1050, *not good*.)



Fig. 256.

The perennial stock, creeping stems, foliage, and peduncles are those of the *white C.*, but the flowers are closely sessile in the head, surrounded by an involucre of lobed bracts as long as the calyx-tubes, and the calyx, after flowering, becomes much inflated, thin and reticulate, with short fine teeth; the flower-head is thin, very compact, half an inch or more in diameter, and often assumes a pink tint, so as to have been compared to a strawberry. Corolla small and red.

In rather dry meadows and pastures,

common in Europe and central and Russian Asia, penetrating far into Scandinavia. Frequent in England, Ireland, and southern Scotland. *Fl. summer and autumn.*

17. White Clover. *Trifolium repens*, Linn. (Fig. 257.)

(Eng. Bot. t. 1769. *Dutch Clover.*)

A glabrous or slightly hairy perennial, the stems creeping and rooting at the nodes. Stipules small. Leaflets obovate, distinctly toothed, and usually bearing a mark in the centre, which has been compared to a horseshoe, the leaf-stalks often very long. Peduncles axillary, long and erect, bearing a globular head, or rather umbel, of white flowers, often tinged with pink; the pedicels, after flowering, more or less elongated and recurved. Calyx-teeth scarcely so long as the tube, the lowest one usually the shortest. Pod containing 2 to 4 seeds, usually protruding from the calyx, but enclosed in the withered corolla.



Fig. 257.

In meadows and pastures, throughout Europe and Russian Asia, from the Mediterranean to the Arctic Circle, and having been long cultivated, and spreading rapidly in genial soils, it is now common in most temperate regions of the globe. Abundant in Britain. In Ireland believed to be of comparatively recent introduction, although it is now taken as the national emblem in substitution of the *Wood-sorrel Oxalis*, which was the original shamrock. *Fl. the whole season.*

18. Hop Clover. *Trifolium agrarium*, Linn. (Fig. 258.)

(*T. procumbens*, Eng. Bot. t. 945.)

A slender annual, much branched at the base, glabrous or slightly downy, procumbent or nearly erect, 6 inches to a foot long, or rather more. Stipules broad and pointed. Leaflets obovate or obcordate, the central one at some distance from the others. Flower-heads loosely globular or ovoid, on rather long axillary peduncles, containing 30 to



Fig. 258.

50 small yellow flowers on very short pedicels; in fading, the flowers become reflexed, and turn pale-brown, with a broadly obovate standard, distinctly marked with longitudinal furrows, and completely concealing the small, 1-seeded pod.

In rather dry pastures and meadows, on the borders of fields, etc., throughout Europe and western Asia, except the extreme north. Abundant in Britain generally, but becoming rare in northern Scotland. *Fl. the whole season.*

19. Lesser Clover. *Trifolium procumbens*, Linn. (Fig. 259.)

(*T. minus*, Eng. Bot. t. 1256.)



Fig. 259.

Very near the *Hop C.*, but more slender and procumbent; the flowers smaller, usually 12 to 20 in a head, and of a paler colour; the standard not so broad, more folded, and only faintly striated. The central leaflet of each leaf is usually at some distance from the others, as in the *Hop C.*, excepting sometimes in the lower leaves. Pedicels of the flowers much shorter than the tube of the calyx.

As common as the *Hop C.* over the greater part of Europe, but does not appear to extend so far to the east or to the north. In Britain, also as abundant as the *Hop C.*, excepting, perhaps, in the north. *Fl. the whole season.* Starved specimens of this species are much like the more luxuriant ones of the *slender C.*, and chiefly distinguished by the shortness of the pedicels.

20. Slender Clover. *Trifolium filiforme*, Linn. (Fig. 260.)

(Eng. Bot. t. 1257.)

Still more slender than the *lesser C.*; the stems decumbent, ascending, or erect, seldom 6 inches long. Leaflets usually narrower than

in the last two species, the central one inserted immediately between the two others, excepting in the upper leaves of very luxuriant specimens. Flowers 2 or 3 in each head, or very seldom as many as 5 or 6, smaller than in the *lesser C.*; the pedicels usually about as long as the calyx.

In sandy or stony pastures and waste places, chiefly near the sea, in southern Europe; very common round the Mediterranean, and extending up western France to the Channel. Rare in Britain, and probably confined to south-eastern England, starved states of the *lesser C.*

having been frequently mistaken for it. I have seen specimens of the true plant from Gravesend, in Kent. *Fl.* early summer.



Fig. 260.

IX. **LOTUS.** LOTUS.

Herbs, with pinnate leaves of 5 (rarely 4) leaflets, of which 2 (or 1), close to the stem, take the place and appearance of stipules. Peduncles axillary, bearing one or several yellow or reddish flowers in an umbel, with a leaf of 3 leaflets close under it. Calyx 5-toothed. Keel pointed. Stamens diadelphous, the upper one free from the base, and 5 of the filaments flattened at the top. Pod cylindrical, with several seeds.

A well-marked genus, not very numerous in species, chiefly abundant in southern Europe and northern Africa, but widely spread over the temperate regions of the old world and Australia.

Perennial. Flowers usually 5 or more in the umbel . . . 1. *Common L.*
 Annual. Flowers small, seldom above 2 in the umbel . . . 2. *Slender L.*

1. **Common Lotus.** *Lotus corniculatus*, Linn. (Fig. 261.)

(Eng. Bot. t. 2090. *Bird's-foot Trefoil*.)

Stock perennial, with a long taproot. Stems decumbent or ascending, from a few inches to near 2 feet long. Leaflets usually ovate or obovate, and pointed, but sometimes narrow; those which take the place of stipules broader than the others. Peduncles much longer than the leaves. Umbels of from 5 or 6 to twice that number of bright yellow flowers; the standard often red on the outside. Calyx-teeth

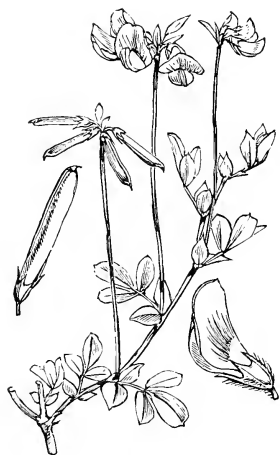


Fig. 261.

about the length of the tube. Pod usually about an inch long. Seeds globular, separated by a pithy substance, which nearly fills the pod.

In meadows and pastures, whether wet or dry, open or shaded, widely spread over Europe, Russian and central Asia, the East Indian Peninsula, and Australia, but not reaching the Arctic Circle. Abundant all over Britain. *Fl. the whole summer*. It is a very variable species, accommodating itself to very different stations and climates; and some of the races appear so permanent in certain localities as to have been generally admitted as species, but in others they run so much into one another as to be absolutely undistinguishable. The most distinct British forms are—

a. *Greater Lotus* (*L. major*, Eng. Bot. t. 2091). Tall, ascending or nearly erect, glabrous or slightly hairy, and luxuriant in all its parts, with 6 to 12 flowers in the umbel. Calyx-teeth usually, but not always, finer and more spreading than in the smaller forms. In moist meadows, along ditches, under hedges, and in rich, bushy places.

b. *Common Lotus*. Low and spreading, often tufted at the base, glabrous or nearly so, usually with 5 or 6 rather large flowers to the umbel. Leaflets broad, and often glaucous, especially near the sea, where they become much thicker. In open pastures and on dry sunny banks.

c. *Hairy Lotus*. Like the common variety, but covered with long spreading hairs. In dry, sunny situations, common in southern Europe, but rare in Britain.

d. *Narrow Lotus* (*L. tenuis*, Eng. Bot. Suppl. t. 2615). Slender and more branched than the common form, with very narrow leaflets. In poor pastures and grassy places, chiefly in south-eastern Europe. Rare in Britain, and always running much into the common form.

2. Slender Lotus. *Lotus angustissimus*, Linn. (Fig. 262.)

(*L. diffusus*, Eng. Bot. t. 925.)

An annual, more slender and branched than the *common L.*, always hairy, and with smaller leaflets. Peduncles short, the flowers scarcely above half the size of those of the *common L.*, often solitary or 2

together, very seldom 3 or even 4 in the umbel. Calyx-teeth longer than the tube. Pod slender, 8 or 9 lines long.

In meadows, pastures, and fields, very common in southern Europe, extending eastward in southern Russia to the Altai, and northward along the coasts of western Europe to the Channel. In Britain, only on the south coasts of Ireland and England, extending eastward to Hastings. *Fl. early summer, and often again in autumn.* The *hispid* *L.* (*L. hispidus*, Eng. Bot. Suppl. t. 2823) is a larger, more hairy variety, having often 3 flowers to the umbel, with a thicker pod, often less than 6 lines long. It has the same range as the more slender variety.



Fig. 262.

X. **ANTHYLLIS.** ANTHYLLIS.

Herbs, with pinnate leaves, and yellow, red, or purple flowers in crowded heads or umbels, with a deeply divided bract close underneath. Calyx inflated, with 5 small teeth. Stamens all united in an entire sheath. Pod enclosed in the calyx, with few seeds.

A genus of few species, chiefly from the Mediterranean region, allied to *Lotus* in inflorescence, to *Genista* in the stamens, and easily distinguished by the calyx.

1. **Common Anthyllis.** *Anthyllis vulneraria*, Linn.

(Fig. 263.)

(Eng. Bot. t. 104. *Kidney Vetch*, or *Lady's-fingers*.)

Stock perennial, and often tufted, with spreading or ascending stems, from a few inches to a foot long; the whole plant more or less clothed with short, appressed, silky hairs. Leaflets narrow and entire, 6 lines long or more; in the upper leaves often numerous and not very unequal; in the lower leaves the terminal leaflet is usually oblong, an inch long or more, with very few much smaller ones along the stalk;



Fig. 263.

or in the first leaves the terminal one stands alone. Flower-heads usually in pairs at the ends of the branches, each one surrounded by a digitate, leafy bract; the flowers numerous and closely sessile. Calyx hairy, much inflated, and contracted at the mouth. Corolla small, varying from a pale or bright yellow to a deep red.

In dry pastures and rocky stony places, chiefly in hilly districts, throughout Europe and western Asia, from the Mediterranean to the Arctic Circle. Ranges generally over Britain, although here and there considerable districts may be without it. *Fl. summer, commencing early.*

XI. ASTRAGAL. ASTRAGALUS.

Herbs, with pinnate leaves, and pink, purple, bluish, pale-yellow, or white flowers, in axillary racemes or spikes, without leafy bracts. Stipules entire at the base (not sagittate). Calyx with 5 teeth. Petals usually narrow. Keel obtuse. Stamens diadelphous, the upper one entirely free. Pod cylindrical or inflated, usually more or less divided lengthwise by a complete or partial partition proceeding from the side next the keel. Seeds several.

A very numerous genus, distributed all over Europe, central and northern Asia, North America, and down the Andes of South America; penetrating far into the Arctic regions, ascending to high alpine summits, and abundant in the hot rocky districts of the Mediterranean region.

Stems 2 or 3 feet long, with large leaflets, and dingy yellow

flowers 3. *Sweet A.*

Low plants, with small leaflets, and bluish-purple flowers.

Flowers 8 or 9 lines long. Pods erect, not twice the length of the calyx 1. *Purple A.*

Flowers not 6 lines long. Pods pendulous, 3 or 4 times the length of the calyx 2. *Alpine A.*

1. **Purple Astragal.** *Astragalus hypoglottis*, Linn. (Fig. 264.)
(Eng. Bot. t. 274.)

A low, slightly hairy perennial, the stem prostrate, branching at the base, 2 to 5 or 6 inches long. Stipules free from the leafstalk, but more or less united together on the opposite side of the stem. Leaflets usually in 10 to 12 pairs with an odd one, 2 or 3 lines long. Flowers of a bluish-purple, in short spikes, on long axillary peduncles. Calyx sessile, erect, about 3 lines long, more or less downy with short black hairs. Standard near 3 times as long as the calyx. Pod shortly stalked within the calyx, ovoid, erect, hairy, seldom 6 lines long, and completely divided by a longitudinal partition into 2 cells, usually with only one seed in each cell.



Fig. 264.

On dry hilly pastures, in central and northern Europe, Russian Asia, and northern America, but not an Arctic plant. In Britain, chiefly in eastern, central, and northern England, and southern Scotland; in Ireland, only indicated on the south islands of Arran on the west coast. *Fl. summer.*

2. **Alpine Astragal.** *Astragalus alpinus*, Linn. (Fig. 265.)
(Eng. Bot. Suppl. t. 2717.)

A small, prostrate, slightly hairy perennial, the stems branching at the base, a few inches or rarely nearly a foot long. Stipules slightly connected with the leafstalk, but quite free from each other. Leaflets 8 to 12 pairs, with an odd one, ovate or oblong. Flowers drooping, of a bluish-purple, or white tipped with purple, in short close racemes, on rather long peduncles; the calyx little more than 1 line; the corolla about 5 lines long, with petals broader in proportion than in the *purple A.* Pod pendulous, about 6 lines long, on a stalk about the length of the calyx, covered with short



Fig. 265.

black hairs, and partially divided inside by a narrow projection from the side next the keel. Seeds 3 to 6.

An alpine plant, common in the great mountain-ranges of central and northern Europe and Russian Asia, and extending far into the Arctic Regions. In Britain, only in the mountains of Clova and Braemar in Scotland. *Fl. summer.*

3. Sweet Astragal. *Astragalus glycyphyllos*, Linn.

(Fig. 266.)

(Eng. Bot. t. 203. *Milkvetch.*)



Fig. 266.

A glabrous perennial, of a light green colour; the zigzag stems spreading along the ground to the length of 2 feet or even more. Stipules free. Leaflets 11, 13, or more, ovate, 1 to $1\frac{1}{2}$ inches long, the common leafstalk full 6 inches. Flowers about 6 or 7 lines long, of a dingy yellow, spreading or pendulous, in racemes rather shorter than the leaves. Pods erect, curved, glabrous, above an inch long, completely divided into 2 cells by a thin double partition, with 6 to 8 seeds in each half.

In rather dry, open woods, and bushy places, over the greater part of Europe and Russian Asia, except the extreme north. Not common in Britain, although it ranges over a great part of England, especially the eastern counties, and southern Scotland; not recorded from Ireland. *Fl. summer.*

XII. **OXYTROPE.** OXYTROPIS.

Low, tufted perennials, only differing from *Astragal* in the keel, which has a small point at its extremity, either erect or slightly recurved, and in the pod, which has an incomplete longitudinal partition projecting into the cavity from the angle next the vexillum (the one which bears the seeds), not from the angle next the keel.

A considerable genus, but not so numerous nor so widely spread as

Astragal, and chiefly confined to mountain stations or high latitudes in Europe, Asia, and North America.

Flowers yellowish 1. *Yellow O.*
 Flowers purple 2. *Purple O.*

1. Yellow Oxytrope. *Oxytropis campestris*, DC. (Fig. 267.)

(*Astragalus*, Eng. Bot. t. 2522.)

Stock short and tufted, covered with the old stipules and leafstalks, seldom lengthening into shortly ascending branches; the leaves and peduncles usually proceeding from the stock. Leaflets 10 to 15 pairs with an odd one, oblong or lanceolate, and hairy; the common leafstalk 2 or 3 inches long. Peduncles rather longer, with a short, spike of pale-yellow flowers, tinged with purple. Calyx hairy, 4 or 5 lines; corolla twice that length; the point of the keel short, straight, and erect. Pod erect, ovoid, covered with short, usually black, hairs; the partition projecting to about the centre of the cavity.

In mountain pastures, and on alpine rocks, common in the great mountain ranges and Arctic regions of Europe, Russian Asia, and Northern America.

In Britain only in one spot, among the Clova mountains of Scotland.
Fl. summer.



Fig. 267.

2. Purple Oxytrope. *Oxytropis uralensis*, DC. (Fig. 268.)

(*Astragalus*, Eng. Bot. t. 466, not exact as to the point of the keel.

O. Halleri, Bab. Man.)

Stock short and tufted, with the foliage, inflorescence, and pod of the *yellow O.*, but the whole plant is much more densely covered with soft, silky hairs; the flowers are of a bright purple, and the pod is more completely divided into two cells. The point of the keel is short and straight, as in the *yellow O.*



Fig. 268.

In mountain pastures, in central Europe and Russian Asia, descending to a low level in the north, and penetrating far into the Arctic regions. Not uncommon in Scotland, in dry, hilly pastures, chiefly near the sea, but does not descend to England. *Fl. summer.*

XIII. **ARTHROLOBE.** ARTHROLOBIUM.

Slender, spreading, glabrous annuals, with pinnate leaves and axillary peduncles, bearing an umbel of minute flowers, without any bract. Calyx tubular. Pod cylindrical, curved, separating, when ripe, into several one-seeded articles.

A genus of very few species, chiefly south European, scarcely distinct from *Coronilla*, and differing from *Bird's-foot* chiefly in the want of the leaf to the umbel.

1. Sand Arthrolobe. *Arthrolobium ebracteatum*, DC.

(Fig. 269.)

(Eng. Bot. Suppl. t. 2844.)

Stems very slender, spreading on the ground to the length of 6 inches. Leaflets 9 to 15, small, obovate or oblong, the lowest pair at some distance from the stem. Stipules very small. Peduncles very slender, with an umbel of from 2 to 5 minute yellow flowers. Pod about an inch long, slender, curved, ending in a short, hooked

beak, and separating into several linear articles.

In sandy situations, near the sea, chiefly in south-western Europe, extending nearly all round the Mediterranean, and northward, up western France to the Channel Islands, and to the Scilly Isles off the coast of Cornwall. *Fl.* spring, and often again towards autumn.



Fig. 269.

XIV. BIRD'S-FOOT. ORNITHOPUS.

Slender, spreading, hairy annuals, with pinnate leaves and axillary peduncles, bearing a head, or umbel, of very few small, pink or white flowers, with a pinnate leaf at their base. Stamens diadelphous, the upper one quite free. Pod narrow, much longer than the calyx, slightly flattened, separating, when ripe, into several one-seeded articles.

A genus of very few, chiefly South European, species, only differing from *Coronilla* by the slightly flattened pod, and by the leaf on the peduncle, under the flowers.

1. Common Bird's-foot. *Ornithopus perpusillus*, Linn.

(Fig. 270.)

(Eng. Bot. t. 369.)

Stems spreading on the ground, or slightly ascending, to the length of 6 or 8 inches. Leaflets 5 to 10 pairs, with an odd one, or sometimes more, small, oval or oblong, and softly hairy, the lowest pair close to the stem. Flowers usually 2 or 3 only on the peduncle, closely sessile over a small, pinnate leaf; the keel short and obtuse.

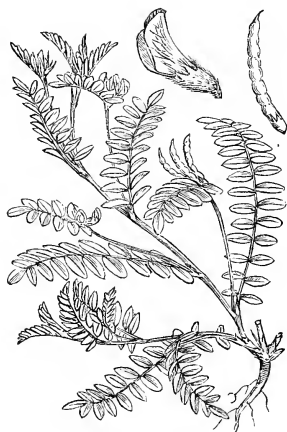


Fig. 270.

Pods slightly downy, about 6 lines long, ending in a curved beak; the articles short and oval.

In dry pastures, in central and southern Europe, scarcely extending to its eastern limits, and northward only into southern Sweden. Abundant in many parts of England and Ireland, less so in Scotland. *Fl. spring and summer.*

XV. HIPPOCREPIS. HIPPOCREPIS.

Herbs or low shrubs, usually glabrous, with pinnate leaves and axillary peduncles, bearing an umbel of yellow flowers, without any leaf. Stamens diadelphous, the upper one quite free. Pod much flattened, of numerous articles, each of them curved like a horseshoe, so that the pod has as many deep notches on one side.

A genus of but few species, chiefly natives of south-western Europe. In flower they cannot well be distinguished from *Coronilla*, but the pod is very different.

1. Common Hippocrepis. *Hippocrepis comosa*, Linn.

(Fig. 271.)

(Eng. Bot. t. 31.)

Stock perennial, with numerous stems branching at the base, and either short and tufted, or spreading along the ground to the length of 6 inches to a foot. Leaflets 9 to 15, small, obovate, oblong, or linear, and glabrous, the lowest pair at a distance from the stem. Flowers 5 to 8 in the umbel, resembling those of the *common Lotus*, and with nearly the same pointed keel, but rather smaller and paler. Pod about

an inch long, ending in a fine point, the notches of the inner edge broad and deep.

In pastures, on banks, etc., chiefly in limestone districts, in central and southern, especially western Europe, not extending to northern Germany. Abundant in some parts of England, but not in Scotland or Ireland. *Fl. spring and summer.*



Fig. 271.

XVI. SAINFOIN. ONOBRYCHIS.

Herbs, with pinnate leaves, without tendrils, and spikes of flowers usually pink, on long axillary peduncles. Stamens diadelphous, the upper one quite free. Pod sessile, flat, hard, one-seeded, and indehiscent, strongly veined or pitted, and usually either prickly, crested, or winged.

A genus of several species, chiefly from the eastern Mediterranean region and west central Asia, very distinct from any other British *Pea-flower*, but only differing from *Hedysarum* (a large European and Asiatic genus, which includes the so-called *French Honeysuckle* of our gardens) in the pods being reduced to a single article.

1. Common Sainfoin. *Onobrychis sativa*, Lam. (Fig. 272.)

(*Hedysarum Onobrychis*, Eng. Bot. t. 96.)

Stock perennial, but of a few years' duration, with several ascending stems, 1 to 1½ or rarely 2 feet long. Stipules brown, thin, and finely pointed. Leaflets numerous, oblong, slightly downy underneath, glabrous above. Peduncles longer than the leaves, bearing in their upper half a spike of pale-pink flowers, at first closely packed, but lengthening out as the flowering advances. Calyx-teeth long and slender. Wings

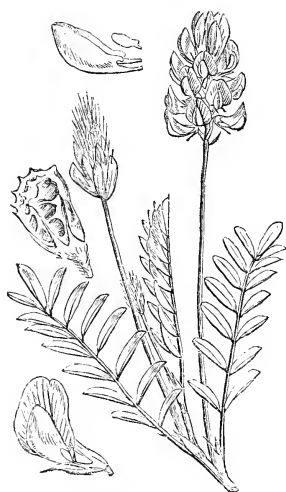


Fig. 272.

of the corolla shorter than the keel and standard. Pod twice as long as the calyx, the upper edge nearly straight, the lower semicircular, bordered with short teeth, sometimes prickly, the flat surface marked with raised veins.

In limestone districts, in central and southern Europe, and temperate Asia; much cultivated for forage, and occasionally naturalized further northward. In Britain, believed to be truly indigenous in southern and eastern England, but not recorded from Ireland. *Fl.* early summer.

XVII. VETCH. VICIA.

Herbs, with weak stems, often slightly climbing, half-sagittate stipules, and pinnate leaves; the leaflets usually numerous; the common leafstalk ending in a simple or branched tendril, or at least in a small point. Flowers in the axils of the leaves, solitary, clustered, or in pedunculate racemes, blue, purplish, white, or pale-yellow. Petals usually rather narrow. Upper stamen quite free, or connected with the others, at least in the middle. Style cylindrical or slightly flattened, with a tuft of hairs below the stigma on the outer side, or shortly downy all round under the stigma, or rarely quite glabrous. Pod more or less flattened, opening in two valves, with several, or rarely only two seeds, either globular or slightly flattened.

A numerous genus, widely spread over nearly the whole globe, but most abundant in temperate regions; in the tropics almost confined to mountain districts, and unknown in Australia. The tendrils distinguish it from all our Leguminous plants, except the following genus, *Pea*, from which it is absolutely separated chiefly by the style; but also in all our species, except the *Bithynian V.*, the more numerous and smaller leaflets, and the general shape of the flowers, give it a peculiar aspect easily recognized. The staminal tube is usually much more oblique at the top than in *Peas*.

Leaflets above an inch long, 1 or 2 pairs to each leaf . . . 10. *Bithynian V.*
 Leaflets more than 2 pairs to each leaf, usually small.

Peduncles elongated (at least half as long as the leaf).

Flowers few and small, on slender peduncles. Pod scarcely 6 lines long.

Plant glabrous or nearly so. Pod with 4 to 6 seeds . . . 2. *Slender V.*

Plant hairy. Pod with 2 seeds 1. *Hairy V.*

Flowers at least 6 lines long. Pod an inch or more.

Leafstalks ending in a short point. Racemes short and close.

Plant quite glabrous, drying black. Stipules quite entire *Black Pea.*

Plant slightly hairy. Stipules usually toothed . . . 5. *Upright V.*

Leafstalks ending in a tendril. Racemes long.

Flowers white, with purplish veins. Stipules deeply divided at the base 4. *Wood V.*

Flowers of a rich purple-blue. Stipules mostly entire 3. *Tufted V.*

Peduncles not longer than the calyx, or flowers quite sessile.

Flowers pale-yellow. Pod hairy 7. *Yellow V.*

Flowers purple blue or red. Pod glabrous.

Flowers 3 or 4 together, shortly stalked 6. *Bush V.*

Flowers sessile, solitary or rarely two together.

Flowers large. Seeds smooth 8. *Common V.*

Flowers small. Seeds granulated 9. *Spring V.*

1. **Hairy Vetch.** *Vicia hirsuta*, Koch. (Fig. 273.)

(*Ervum*, Eng. Bot. t. 970.)

A more or less hairy annual, with slender, weak stems, 1 to 3 feet long, often climbing by means of the branched tendrils. Stipules small, narrow, often divided. Leaflets small, oblong, 6 to 8 pairs to each leaf. Peduncles slender, with very few, usually 2 or 3, insignificant, pale-blue flowers, the fine teeth of the calyx almost as long as the standard. Style glabrous. Pod nearly 6 lines long, flat and hairy, containing two slightly compressed seeds, with a long, linear hilum.

In hedges, cornfields, and waste places, common in Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Extends all over Britain, but said to be rare in the Highlands of Scotland. *Fl. the whole summer.*



Fig. 273.

2. Slender Vetch. *Vicia tetrasperma*, Mœnch. (Fig. 274.)
(*Ervum*, Eng. Bot. t. 1223.)



Fig. 274.

A slender annual, glabrous or nearly so, the weak stems often climbing, from 6 inches to near 2 feet long. Leaflets narrow, the lower ones obtuse, 3 to 6 pairs in each leaf, the tendrils simple or branched. Peduncles slender, with 1 to 6 or 7 pale-bluish flowers, longer than in the *hairy V.*, but much smaller than in any other British *Vetch*, seldom exceeding 3 lines. Calyx-teeth much shorter than the standard. Pod flat, not above 6 lines long, usually containing about 4 seeds, but sometimes 5 or 6.

In fields, hedges, and waste places, all over temperate Europe and Russian Asia. Not uncommon in England, more rare in Scotland and Ireland. *Fl. the whole summer.* A variety with more pointed leaflets, and with the number of seeds more frequently 5 or 6, has been distinguished under the name of *V. gracilis* (Eng. Bot. Suppl. t. 2904).

3. Tufted Vetch. *Vicia Cracca*, Linn. (Fig. 275.)
(Eng. Bot. t. 1168.)



Fig. 275.

Rootstock perennial, the annual stems weak, and climbing by means of the branched tendrils, to the length of 2 or 3 feet or rather more; the whole plant hairy, or nearly glabrous. Stipules narrow and entire. Leaflets numerous, oblong or linear, the largest 8 or 9 lines long. Flowers numerous, in one-sided racemes, on peduncles rather longer than the leaves, of a fine bluish-purple, each one about 5 lines long. Style hairy all round below the stigma. Pod flattened, glabrous, about an inch long, with 6 or 8 seeds.

In hedges and bushy places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic Circle, and in northern America. Common in Britain. *Fl. summer.*

4. Wood Vetch. *Vicia sylvatica*, Linn. (Fig. 276.)

(Eng. Bot. t. 79.)

A handsome usually glabrous species, climbing over shrubs and small trees, sometimes to the length of 6 or 8 feet. Stipules deeply divided at their base. Leaflets fewer and broader than in the *tufted V.*, usually 8 or 10 pairs to each leaf, oblong, or the lower ones ovate, obtuse or notched at the top. Flowers considerably longer than in the *tufted V.*, white with bluish streaks, loosely drooping in long racemes. Pod glabrous, broad, an inch long, with 4 to 6 seeds.

In open woods and bushy places, in the hilly, and especially the northern districts of Europe and Russian Asia, to the Arctic Circle, and in the mountains of southern Europe and central Asia. Not uncommon in Scotland, and occurs in most hilly, wooded districts of England and Ireland. *Fl. summer.*



Fig. 276.

5. Upright Vetch. *Vicia Orobus*, DC. (Fig. 277.)(*Orobus sylvaticus*, Eng. Bot. t. 518.)

A slightly hairy, branching perennial, with a somewhat creeping rootstock; the stems more erect than in the other *Vetches*, and the tendrils all reduced to a fine point terminating the leafstalk, or in the upper leaves replaced by a terminal leaflet, as in the *black Pea*, but the plant does not usually dry black, as in that species, and the style is that of the *tufted Vetch*. Stipules broader than in the last two species, and slightly toothed. Leaflets 8 to 10 pairs to each leaf, narrow-oblong, with a fine point. Peduncles about the length of the leaf, with a close raceme of 6 to 10 rather large flowers of a purplish-white. Pods flattened, about an inch long, with 3 or 4 seeds, or rarely more.



Fig. 277.

In mountain pastures and woods, in western Europe, from the Pyrenees to southern Norway, reappearing eastward in Bavaria and Transylvania. In Britain, spread over Wales, northern England, and a great part of Scotland, more rare in Ireland. *Fl. early summer.*

6. Bush Vetch. *Vicia sepium*, Linn. (Fig. 278.)

(Eng. Bot. t. 1515.)



Fig. 278.

A slightly hairy perennial; the stems 1 to 2 feet high, weak and straggling, but scarcely climbing. Stipules small and entire, or larger and toothed. Leaflets 4 to 6 pairs in each leaf, ovate or oblong; the leafstalk ending in a tendril, usually branched. Flowers smaller than in the common *V.*, of a light reddish-purple, 2 to 4 together in the axils of the upper leaves, drooping from short pedicels, and forming a sessile cluster or a very short raceme. Style with a dense tuft of hairs under the stigma on the outer side, with a few short hairs on the opposite side. Pod glabrous, about an inch long. Seeds few, half encircled by the long, linear hilum.

In woods and shady places, and hedges, extending over Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Common in Britain. *Fl. all summer.*

7. Yellow Vetch. *Vicia lutea*, Linn. (Fig. 279.)

(Eng. Bot. t. 481.)

A glabrous or slightly hairy annual, said however by some to form a perennial rootstock; the stems spreading, branched, usually low, but sometimes ascending to a foot or more. Stipules, foliage, and solitary flowers of the common *V.*, but the corolla is of a pale-yellow, and the

rather broad pods are reflexed, and covered with long hairs. Seeds few, with a short hilum.

In dry, stony, waste or cultivated places, in central and southern Europe to the Caucasus, not extending into northern Germany. In Britain, chiefly near the sea in southern England, and again on the rocky coasts of eastern Scotland, probably introduced with ballast. Not recorded from Ireland. *Fl.* early summer.



Fig. 279.

8. Common Vetch. *Vicia sativa*, Linn. (Fig. 280.)

(Eng. Bot. t. 334. *V. lævigata*, Eng. Bot. t. 483.)

An annual or biennial, glabrous or hairy; the stems short and spreading, or nearly erect, or almost climbing, 1 to 2 feet high. Stipules toothed, and usually marked by a dark spot in the centre. Leaflets usually 4 to 7 to each leaf, varying from obcordate or obovate to narrow-linear, the tendrils usually branched. Flowers sessile and solitary, or rarely two together in the axils of the leaves, usually large, of a reddish or bluish purple. Pod glabrous, 1 to 2 inches long, rather narrow, with 10 to 12 smooth, globular seeds.

In dry pastures, open woods, and waste places, throughout Europe and Russian Asia, and having been long cultivated for forage, is now widely spread



Fig. 280.

over the temperate regions of the globe. *Fl. spring and early summer.* In the cultivated state the stems are 1 to 2 feet high, the leaflets usually broad, and the flowers large; in the more common wild form, often distinguished as a species, under the name of *V. angustifolia* (Eng. Bot. Suppl. t. 2614), the leaflets are narrower, and flowers rather smaller; and the low spreading variety, published as *V. Bobartii* (Eng. Bot. Suppl. t. 2708), is only to be distinguished from the *spring V.* by the smooth seeds, and somewhat larger flowers and pods.

9. Spring Vetch. *Vicia lathyroides*, Linn. (Fig. 281.)

(Eng. Bot. t. 30.)



Fig. 281.

A low spreading annual or biennial, glabrous or nearly so; the stems branching at the base, seldom 6 inches long; the foliage, solitary flower, and general appearance those of the smaller specimens of the *common V.*; the flowers are however smaller, usually of a richer purple, the calyx less decidedly oblique at the base, and the pod seldom an inch long. The seeds are also rough with raised dots, a distinction believed to be constant.

In dry pastures, open woods, banks, etc., over the whole of Europe, except the extreme north, extending eastward to the Caucasus. Not uncommon in England, Ireland, and the greater part of Scotland. *Fl. spring.*

10. Bithynian Vetch. *Vicia bithynica*, Linn. (Fig. 282.)

(Eng. Bot. t. 1842.)

A glabrous or slightly downy annual, with weak angular stems, 1 to 2 feet long. Leaves more like those of a *Pea* than of a *Vetch*, having usually only two pairs of leaflets, obovate in the lowest leaves, oblong or lanceolate and above an inch long in the others, the tendrils branched. Stipules rather broad and toothed. Flowers solitary or two together, on peduncles sometimes very short, sometimes half as long as the leaves, rather large, of a bluish-purple with very pale wings, and shaped like

those of the *common V.* Style with a tuft of hairs under the stigma on the outer side. Pod 1 to $1\frac{1}{2}$ inches long, about 4 lines broad, usually more or less hairy. Seeds 4 to 6.

In bushy or stony waste places, chiefly near the sea, but spreading inland as a cornfield weed, in southern Europe to the Caucasus, extending up western France to Bordeaux, and reappearing in the south-western counties of England. *Fl. summer.*



Fig. 282.

XVIII. PEA. LATHYRUS.

Herbs, with weak stems, sometimes climbing, and half-sagittate or sagittate stipules; the leaves usually pinnate, with few leaflets larger than in the *Vetches*, the common leafstalk ending in a simple or branched tendril or in a small point, the leaflets sometimes wanting. Flowers solitary or in racemes, on axillary peduncles, purple, red, white, or bright yellow. Petals usually broad, especially the standard. Upper stamen free, or more frequently connected with the others, at least in the middle. Style flattened below the stigma, quite glabrous on the outer side, but more or less downy on the inner face for some way below the stigma. Pod cylindrical or flattened. Seeds several, usually globular or angular.

A considerable genus, with the wide geographical range of the *Vetches*, differing from them chiefly by the style, and, in most cases, by the fewer and longer leaflets and broader petals. The calyx is usually more oblique, the upper teeth shorter than the lower ones. Several species are very apt to dry black, which is seldom the case with the *Vetches*.

Leafstalks without real leaflets.

Stipules large and leaf-like. Leafstalk a mere tendril.

Flowers yellow 2. *Yellow P.*

Stipules none. Leafstalk flattened, resembling a grass-

leaf. Flowers pale-red 1. *Grass P.*

Leaves with one pair of leaflets.

Annual, with small red flowers. Pods hairy 3. *Rough P.*

Perennials, with large red or purplish flowers. Pods glabrous.

Rootstock tuberous. Stems not winged 5. *Earthnut P.*

Rootstalk without tubers. Stems winged 6. *Everlasting P.*

Perennial, with yellow flowers. Pods glabrous 4. *Meadow P.*

Leaves with two or more pairs of leaflets.

Stipules deeply divided *Bithynian Vetch.*

Stipules entire.

Leafstalk ending in a simple or branched tendril.

Leaflets lanceolate. Stipules narrow, half-sagittate 7. *Marsh P.*

Leaflets ovate or elliptical. Stipules large, broadly ovate, sagittate 8. *Sea P.*

Leafstalk ending in a short fine point.

Leaflets 2 or 3 pairs, rarely 4 pairs, lanceolate or linear 9. *Tuberous P.*

Leaflets 5 or 6 pairs, rarely 4 pairs, ovate . . . 10. *Black P.*

The Sicilian *sweet Pea*, the *Tangiers Pea*, the South American *Anson's Pea*, and some other exotic species, are cultivated in our flower-gardens. The *Pea* of our kitchen-gardens and fields is usually distinguished as a genus, under the name of *Pisum*, but upon characters which are hardly sufficient for the separation of a solitary species.

1. Grass Pea. *Lathyrus Nissolia*, Linn. (Fig. 283.)

(Eng. Bot. t. 112. *Vetchling. Grass Vetch.*)



Fig. 283.

An erect, glabrous annual, branching from the base, about a foot high. Leaves all reduced to a long, linear, grass-like, flattened leafstalk, ending in a fine point, without leaflets or stipules. Peduncles long, bearing immediately below their summit 1 or rarely 2 small pale-red flowers. Pod long, narrow, and straight.

In bushy places, grassy borders of fields, and stony pastures, in central and southern Europe to the Caucasus, but not extending into northern Germany. In Britain, spread over central and southern England, but rare, and not known in Ireland or Scotland. *Fl. early summer.*

2. Yellow Pea. *Lathyrus Aphaca*, Linn. (Fig. 284.)

(Eng. Bot. t. 1167. *Yellow Vetchling*.)

A weak, branching, glabrous annual, about a foot long, without real leaflets, but the two large, broadly heart-shaped, or sagittate stipules, assume the appearance of simple opposite leaves, with a slender branching tendril between them. Peduncles long and slender, with 1 or rarely 2 small yellow flowers. Pod rather more than an inch long, flattened, glabrous, containing 4 to 8 seeds.

In waste and cultivated places, in central and southern Europe and central Asia, spreading northwards as a cornfield weed, and, as such, appearing occasionally in the southern counties of England. *Fl.* early summer.



Fig. 284.

3. Rough Pea. *Lathyrus hirsutus*, Linn. (Fig. 285.)

(Eng. Bot. t. 1255.)

A weak annual, much branched at the base, a foot long or more, with the young shoots slightly hairy. Stipules narrow. Tendrils branched, with a single pair of linear-lanceolate leaflets. Peduncles long, with 1 or 2 rather small flowers. The standard bright red, the keel and wings paler. Pod hairy.

In cultivated and waste places, in southern Europe to the Caucasus, spreading northwards as a cornfield weed, and as such has been found in Essex and in Somersetshire. *Fl.* early summer.



Fig. 285.

4. Meadow Pea. *Lathyrus pratensis*, Linn. (Fig. 286.)

(Eng. Bot. t. 670.)



Fig. 286.

A weak, much branched, glabrous perennial, straggling or half climbing to the length of 1 to 2 feet or rather more. Stipules large, broadly lanceolate, and sagittate. Tendrils branched, with one pair of narrow-lanceolate or linear leaflets. Peduncles elongated, with a short raceme of 6 to 10 or rarely more yellow flowers. Pod glabrous.

In moist meadows and pastures, throughout Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Abundant in Britain. *Fl. all summer.*

5. Earthnut Pea. *Lathyrus tuberosus*, Linn. (Fig. 287.)

Fig. 287.

Rootstalk perennial, slender, forming small tubers; the annual stems weak, branching, ascending to the height of the corn in which it grows, glabrous, the angles not winged. Leafstalks ending in a branched tendril, and bearing a single pair of obovate, oblong or broadly lanceolate leaflets. Stipules lanceolate, half-sagittate. Peduncles 3 to 6 inches long, bearing a loose raceme of red flowers, very handsome although not usually so numerous as in the *everlasting P.*, and rather smaller. Pod glabrous, rather more than an inch long.

In grassy wastes and hedge-banks, but more especially in cornfields, frequent in many parts of central Europe and

Russian Asia. In Britain, only around Fyfield in Essex, where it is abundant, and probably an ancient denizen, although first noticed, at least in modern days, by Mr. O. Corder, in 1859. *Fl. summer.*

6. **Everlasting Pea.** *Lathyrus sylvestris*, Linn. (Fig. 288.)

(Eng. Bot. t. 805.)

A glabrous perennial, with a creeping rootstock, and straggling or climbing stems, attaining 3 to 5 or even 6 feet, the angles expanded into narrow green wings. Leafstalks also flattened or winged, ending in a branched tendril, and bearing a single pair of long lanceolate leaflets. Stipules narrow. Peduncles 6 inches long or more, bearing a loose raceme of rather large flowers of a pale reddish-purple; the standard very broad, with a green spot on the back, and the keel also partially green. Pod 2 or 3 inches long or even more. Seeds numerous, slightly flattened.



Fig. 288.

In hedges, thickets, and bushy or rocky places, scattered over the greater part of Europe except the extreme north, but chiefly abundant in the south. Occurs in many localities in England, but probably not indigenous in Scotland, and not recorded from Ireland. *Fl. summer, often lasting late.* The *everlasting Pea* of our gardens is a broad-leaved variety from southern Europe, with larger, more richly coloured flowers, and some slight difference in the seeds. It has been distinguished as a species, under the name of *L. latifolius* (Eng. Bot. t. 1108), and, escaping from cultivation, will often establish itself in the vicinity of gardens.

7. **Marsh Pea.** *Lathyrus palustris*, Linn. (Fig. 289.)

(Eng. Bot. t. 169.)

A glabrous, somewhat climbing perennial, not half the size of the *everlasting P.*, and the wings of the stem much narrower. Stipules half-sagittate. Leaflets oblong-lanceolate, 2 to 4 pairs to each leaf, the tendrils usually branched. Flowers smaller and not so broad as in



Fig. 289.

the *everlasting P.*, of a bluish-purple colour, from 2 to 8 in the raceme. Pod glabrous, rather more than an inch long.

In moist meadows and boggy places, in northern and central Europe, Russian Asia, and northern America. Dispersed over a few localities in England and Ireland, but only a very doubtful inhabitant of Scotland. *Fl. summer.*

8. Sea Pea. *Lathyrus maritimus*, Bigel. (Fig. 290.)

(*Pisum*, Eng. Bot. t. 1046.)



Fig. 290.

A glabrous, rather stout, branching perennial, with a creeping rootstock, and sharply angular spreading stems about a foot long. Stipules broad and leaf-like, sagittate at the base, both sides nearly alike. Leaflets 5 or 6 pairs to each leaf, those next the stem often 2 inches long by 1 broad, the tendril simple or branched. Peduncles about the length of the leaves, with a raceme of 6 to 8 large flowers of a bluish-purple. Pod hairy, at least when young, 1 to 2 inches long.

On gravelly seacoasts, in northern and Arctic Europe, Asia, and America, not extending southwards in Europe beyond the shores of Picardy. Occurs in a few localities on the coasts of southern and eastern England, of Shetland, and of Kerry in Ireland. *Fl. summer.*

9. Tuberous Pea. *Lathyrus macrorrhizus*, Wimm. (Fig. 291.)

(*Orobus tuberosus*, Eng. Bot. t. 1153.)

Rootstock perennial, forming small tubers; the annual stems glabrous, nearly erect, simple or nearly so, 6 inches to a foot high. Leaves without tendrils; the leafstalk ending in a fine point, or sometimes in a narrow leaflet; the leaflets usually 2 pairs, sometimes 3 or even 4 pairs, oblong-lanceolate or linear. Peduncles slender, bearing a loose raceme of 2 to 4 flowers of a bright reddish-purple. Pod glabrous, about $1\frac{1}{2}$ inches long. The whole plant dries black like the following species.



Fig. 291.

In thickets and open woods, under hedges, etc., throughout Europe, except the extreme north. Abundant in Britain. *Fl. spring and early summer.* This and the black *P.* form part of the old genus *Orobus*, still kept up by many botanists, but only differing from *Pea* by the want of tendrils to the leaves.

10. Black Pea. *Lathyrus niger*, Wimm. (Fig. 292.)

(*Orobus*, Eng. Bot. Suppl. t. 2788.)

A glabrous perennial, always turning black in drying; the rootstock short and not tuberous; the stems erect or ascending, branched, 1 to 2 feet high or even more. Stipules small and narrow. Leaflets 4 to 6 pairs to each leaf, ovate or elliptical, 6 lines to an inch long, the common stalk ending in a short point. Peduncles longer than the leaves, with a short raceme of 6 to 8 flowers. Pod glabrous, near 2 inches long.

In mountainous and rocky districts, throughout temperate Europe to the Caucasus, extending far into Scandinavia. In Britain, only known from two localities, in Perth and Forfar. *Fl. summer.*



Fig. 292.

XXV. THE ROSE FAMILY. ROSACEÆ.

Herbs, shrubs, or trees, with alternate leaves, mostly toothed or divided, the stipules seldom wanting and often leaf-like. Flowers in cymes, or solitary at the ends of the year's shoots, or more rarely in lateral bunches or racemes. Sepals 4 or 5, united at the base into a lobed calyx, usually enclosing the ovary or adhering to it. Petals 4 or 5 or rarely none. Stamens usually indefinite in number, inserted with the petals on the calyx below its lobes. Ovary of 1, 2, or more carpels, usually distinct at the time of flowering, but sometimes combined even into a single 5-celled ovary, which is then always inferior or combined with the calyx. As the fruit enlarges, the carpels either remain free or are variously combined with each other or with the calyx. Seeds 1 or 2 (or in *Spiræa* 3 or 4) in each carpel. Embryo with large cotyledons and no albumen.

A numerous family, widely spread over the globe, but more in the temperate and cooler parts of the northern hemisphere than within the tropics. The indefinite stamens inserted on the calyx are sufficient to distinguish the greater number of the genera from all other British plants. In the few cases where the stamens are apparently definite, there are no petals, but they then differ widely from all other apetalous genera by their stipules and divided leaves, as well as by the structure of the ovary.

1	{	Ovary or ovaries superior or free from the calyx, though sometimes enclosed in it	2
		Ovary or ovaries inferior or adhering to the calyx-tube, which is closed over them	14
2	{	A single ovary	3
		Several ovaries	4
3	{	Trees with a deciduous calyx and succulent fruit	1. PRUNUS.
		Herbs, with the calyx persisting round the dry seed-vessel	4
4	{	No petals. (Herbs)	5
		Four, five, or more petals. (Herbs or shrubs)	8
5	{	Leaves palmately lobed or digitate. Flowers in loose panicles or cymes	6
		Leaves pinnate. Flowers in heads	7
6	{	Calyx single, 4-lobed	9. ALCHEMIL.
		Calyx double, 5 large and 5 small lobes	8. SIBBALDIA.
7	{	Heads purplish. Flowers hermaphrodite, with 4 stamens	10. SANGUISORB.
		Heads green. Flowers diœcious, the males with numerous stamens	11. POTERIUM.

- | | | | |
|----|---|---|----------------|
| 8 | { | Calyx-tube short and nearly flat, not enclosing the carpels | 9 |
| | | Calyx-tube closing over the carpels or seeds | 14 |
| | { | Calyx single | 10 |
| 9 | { | Calyx double, having as many external bracts as divisions, and alternating with them | 12 |
| 10 | { | Calyx-segments 5 | 11 |
| | | Calyx-segments about eight. Carpels dry and distinct when ripe 3. DRYAS. | |
| 11 | { | Carpels dry, opening when ripe | 2. SPIRÆA. |
| | | Carpels succulent, forming a kind of granulated berry | 5. RUBUS. |
| 12 | { | Carpels dry, ending in a long jointed awn | 4. AVENS. |
| | | Carpels without awns, small and seed-like | 13 |
| 13 | { | Carpels few, on a minute dry receptacle | 8. SIBBALDIA. |
| | | Carpels numerous, on a small, flat, dry receptacle | 7. POTENTIL. |
| | | Carpels numerous, on a large, succulent receptacle | 6. STRAWBERRY. |
| 14 | { | Trees or shrubs. Calyx-tube fleshy. Fruit succulent or fleshy | 15 |
| | | Herbs. Calyx-tube dry, small, with hooked bristles forming a burr | 12. AGRIMONY. |
| 15 | { | Fruit enclosing from 1 to 5 cells or hard nuts, arranged round the central axis, and each with 1 or 2 seeds | 14. PYRUS. |
| | | Fruit enclosing several hairy, seed-like carpels irregularly placed | 13. ROSE. |

These Genera are usually distributed into three Tribes, considered by some botanists as distinct Orders, viz. :—

1. AMYGDALÆ. Calyx deciduous. Carpels 1, free. *Genus* :—1. PRUNUS.
2. ROSEÆ. Calyx persistent. Carpels 1 or more, free (but sometimes included in the closed calyx). *Genera* :—2. SPIRÆA; 3. DRYAS; 4. AVENS;
5. RUBUS; 6. STRAWBERRY; 7. POTENTIL; 8. SIBBALDIA; 9. ALCHEMIL;
10. SANGUISORB; 11. POTERIUM; 12. AGRIMONY; 13. ROSE.
3. POMACEÆ. Calyx persistent, adherent to the ovary, the carpels of which are united, at least in the ripe fruit. *Genera* :—14. PYRUS; 15. HAWTHORN;
16. COTONEASTER; 17. MEDLAR.

The double-flowering *Kerria japonica*, so frequently to be met with trained upon cottage garden-walls, formerly supposed to be a species of *Corchorus*, is now known to belong to the *Rose* family.

I. PRUNUS. PRUNUS.

Shrubs or trees, with undivided toothed leaves, and small, free stipules, often scarcely visible; the flowers either in small bunches on a former year's wood, or in racemes in the axils of young leaves. Calyx free, 5-lobed. Petals 5. Stamens numerous. Ovary of 1 carpel, containing 2 pendulous ovules. Fruit a fleshy or juicy drupe, with a hard stone, smooth or rugged, but not wrinkled on the surface, containing 1, or rarely 2 seeds.

A considerable genus, distributed over the whole of the northern hemisphere, and even abundant within the tropics, both in the new and the old world, but not extending into the south temperate zone. It is the only British genus with a stone fruit.

Flowers in axillary racemes 3. *Birdcherry P.*
 Flowers solitary or clustered, from leafless buds.

Flowers single or two together, on short pedicels 1. *Blackthorn P.*

Flowers in clusters, on pedicels longer than the flower itself 2. *Cherry P.*

The well-known *common Laurel* and *Portugal Laurel* of our gardeners, are species of *Prunus* (*P. Lauro-cerasus* and *P. lusitanicus*), and have no affinity with the true Laurel of the ancients, which is our *Bay-tree* (*Laurus nobilis*). The *Mahaleb* (*P. Mahaleb*) and the *P. semperflorens*, both from the continent of Europe, are also frequently to be met with in our shrubberies. The *Apricot* is another *Prunus* (*P. armeniaca*); the *Almond*, the *Peach*, and the *Nectarine*, belong to the genus *Amygdalus*, only differing from *Prunus* in the wrinkled surface of the stone.

1. Blackthorn *Prunus*. *Prunus communis*, Huds.

(Fig. 293.)

(*P. spinosa*, Eng. Bot. t. 842, and *P. insititia*, Eng. Bot. t. 841. *Blackthorn* or *Sloe*.)



Fig. 293.

In the common, truly wild state, this is a much branched shrub, the smaller branches often ending in a stout thorn. Leaves ovate or oblong, stalked, and finely toothed, usually glabrous, but occasionally, especially the under sides as well as the young shoots, more or less downy. Flowers small, white, nearly sessile, solitary or in pairs, appearing before the leaves. Fruit small, globular or shortly ovoid, nearly black, with a bluish bloom.

In hedges, thickets, and open woods, common in Europe and in Russian and central Asia. Abundant in Britain. *Fl. early spring*. A variety of a somewhat taller growth, and less thorny,

with the leaves rather more downy, and the fruit rather more oblong and less acrid, has been distinguished under the name of *P. insititia*. It is

more abundant and more marked in south-eastern Europe and central Asia than with us. The *Bullace*, the *Damson*, and the numerous varieties of *Plum*, of our gardens, although growing into thornless trees, are believed to be varieties of the *Blackthorn*, produced by long cultivation; they will occasionally sow themselves, and may be found apparently wild in the neighbourhood of gardens and orchards, retaining their arborescent character. Some botanists distinguish these varieties as a species, under the name of *P. domestica* (Eng. Bot. t. 1783).

2. Cherry *Prunus*. *Prunus Cerasus*, Linn. (Fig. 294.)

(Eng. Bot. t. 706, and Suppl. t. 2863.)

The *Cherry*, when wild, is often a mere shrub of 6 or 8 feet, throwing out suckers from its creeping roots, or more properly rhizomes; but in cultivation, and often, also, in a really wild state, it will form a tree of considerable size. Stipules narrow, often toothed and glandular, but very deciduous. Leaves ovate or ovate-lanceolate, and toothed, 2 to 4 inches long, usually with 1 or 2 glands at the top of the stalk or on the edge of the blade, near the base; but they are sometimes wanting on the same specimen. Flowers white, on pedicels from 1 to 2 inches long, in bunches of 2, 3, or more, issuing together from leafless buds, surrounded by brown scales, of which the inner ones often become green and leaf-like at the tips. Fruit globular and smooth, red or black, usually without bloom.

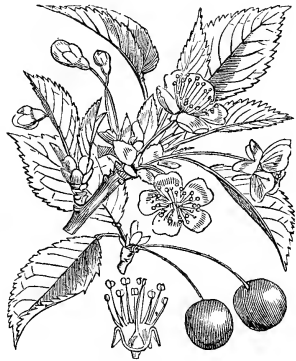


Fig. 294.

In woods, thickets, and hedgerows, in central and southern Europe and temperate Asia, extending northwards into Scandinavia, but has been in so many places introduced by cultivation, that its precise limits can scarcely be fixed. Generally dispersed over England, Ireland, and southern Scotland, but in many cases truly indigenous. *Fl. spring*. There are several more or less permanent varieties in cultivation, which are variously distributed by different botanists into several species, of which *P. avium*, for the tree variety, without suckers, and *P. Cerasus* for the shrubby form, are generally adopted; but none of the characters given appear to be constant in a wild state.

3. Birdcherry *Prunus*. *Prunus Padus*, Linn. (Fig. 295.)

(Eng. Bot. t. 1383.)

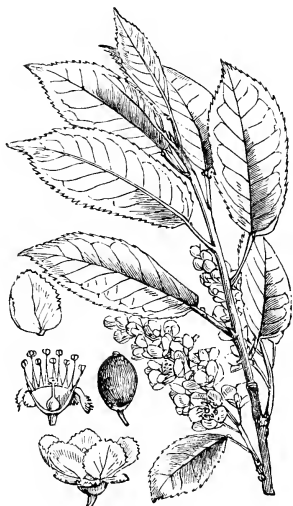


Fig. 295.

A shrub of 6 or 8 feet, or sometimes a small tree, always glabrous. Leaves oval or ovate-lanceolate, finely toothed, and slightly cordate at the base. Flowers white, rather small, in loose, often drooping racemes of 2 or 3 to near 6 inches, on short, leafy, or rarely leafless branches, on the last year's wood. Fruit small, nearly globular, black and bitter, with a rugged stone.

In woods, thickets, and hedges, in northern and central Europe and Asia, from the Arctic regions to the Caucasus and Himalaya, but disappearing in southwestern Europe. Scattered over various parts of Britain, but absent or rare in southern England, and a great part of Ireland. *Fl. spring.*

II. **SPIRÆA.** SPIRÆA.

Herbs, with pinnate leaves, or in exotic species, shrubs, showing much diversity in foliage. Flowers usually small and numerous, in elegant terminal cymes or panicles. Calyx free, 5-lobed. Petals 5. Stamens numerous. Carpels 3 or more, usually 5, quite free from the calyx, forming as many dry capsules, opening when ripe along the inner edge, and containing 2 or more seeds.

A considerable genus, spread over the northern hemisphere both in the new and the old world, but scarcely penetrating into the tropics. It is easily recognized by its deliscent, capsular carpels, and among British *Rosaceæ*, by the numerous small flowers.

Leaves with few large segments, white underneath 1. *Meadow S.*
 Leaves with numerous small segments, deeply toothed 2. *Common S.*

Several North American and Asiatic shrubby species of *Spiræa* are cultivated in our shrubberies and flower-gardens, and among them the

Willow S. (*S. salicifolia*, Eng. Bot. t. 1468), with simple oblong or lanceolate leaves, and small crowded panicles of pink flowers, has been admitted into our Floras as occurring in several parts of northern England and southern Scotland, but apparently only where it has been planted. It is a native of eastern Europe and Russian Asia.

1. Meadow Spiræa. *Spiræa Ulmaria*, Linn. (Fig. 296.)

(Eng. Bot. t. 960. *Meadow-sweet*.)

Stock perennial, with erect, rather stout, annual stems, 2 or 3 feet high, usually glabrous and reddish. Leaves large, pinnate, with 5 to 9 ovate or broadly lanceolate segments often 2 or 3 inches long, irregularly toothed, green above, soft and whitish underneath, the terminal one deeply divided into three; besides which are several smaller segments along the common stalk. Stipules broad and toothed. Flowers small, of a yellowish-white, sweet-scented, and very numerous, in compound corymbose cymes at the summit of the stems. Capsules 5 to about 8, very small, and more or less spirally twisted.

In meadows, on the banks of ponds and ditches, etc., throughout Europe and Russian Asia, except the extreme north. Common in Britain. *Fl. summer*.



Fig. 296.

2. Common Spiræa. *Spiræa Filipendula*, Linn. (Fig. 297.)

(Eng. Bot. t. 284. *Dropwort*.)

Stock perennial, the fibrous roots swollen here and there into oblong tubers. Stems erect, 1 to 2 feet high. Leaves chiefly radical or in the lower part of the stem, 3 to 5 inches long, with numerous (above 20) small, oval, oblong or lanceolate segments, deeply toothed or pinnately lobed, gradually smaller as they near the stem, green and glabrous, or slightly downy. Stipules broad, adhering to the leaf-stalk nearly their whole length. Flowers like those of the *meadow*



Fig. 297.

S., but rather larger, and often tipped with red. Carpels 6 to 12, not twisted.

In meadows, pastures, and open woods, generally dispersed over Europe and Russian Asia, except the extreme north. Rather frequent in England, extending into southern Scotland, but not recorded in the Irish Flora. *Fl. summer.*

III. **DRYAS.** DRYAS.

Tufted or creeping perennials, with undivided leaves and rather large white flowers, growing singly on long peduncles. Calyx free, 8- to 10-lobed. Petals 8 to 10, or rarely fewer. Carpels numerous, crowded on the receptacle, 1-seeded and indehiscent, ending when ripe in long feathery awns or tails, which are not jointed.

The genus consists of but two, or perhaps three species, confined to the high mountains or Arctic regions of Europe, Asia, and North America.

1. **White Dryas.** *Dryas Octopetala*, Linn. (Fig. 298.)

(Eng. Bot. t. 451. *D. depressa*, Bab. Man.)

Stems short, much branched, prostrate or creeping, forming with their crowded foliage dense spreading tufts. Leaves little more than 6 lines long, oblong, deeply and regularly crenate, green, glabrous, and almost shining above, white and downy underneath. Peduncles

erect, 2 or 3 inches long. Segments of the calyx usually 8, rather shorter than the petals. Feathered awn of the carpels above an inch long.

General geographical range nearly the same as that of the genus. In Britain, not uncommon in the limestone mountain-districts of northern England and Ireland, but particularly abundant in the north of Scotland. *Fl. summer.*



Fig. 298.

IV. **AVENS.** GEUM.

Herbs, with a short perennial, sometimes slightly creeping stock, and annual, erect stems. Leaves pinnate, with a few and very unequal distinct segments, and yellow or red or white flowers growing singly on long peduncles at the ends of the stem or branches. Calyx of 5 equal divisions, with 5 very small outer ones alternating with them. Petals 5. Stamens numerous. Carpels numerous, 1-seeded, indehiscent, ending in a hairy point or awn, which is hooked at the tip.

A genus of several species, widely diffused over the temperate and colder regions of Europe, Asia, and North America, and descending along the Andes to extratropical South America.

1. **Common Avens.** *Geum urbanum*, Linn. (Fig. 299.)

(Eng. Bot. t. 1400. *Herb-Bennet.*)

Stems erect, slightly branched, 1 to 2 feet high, nearly glabrous. Stipules large and leaf-like, the upper ones sometimes above an inch long and broad, and coarsely toothed or lobed. Leaves thin, light green, the lower ones with several large segments intermixed with small ones, the upper ones usually with only 3 large segments, or a single one divided into 3, and sometimes 2 or 3 small ones along the stalk, all coarsely toothed. Flowers yellow, with small spreading petals. Carpels in a close, sessile head, covered with silky hairs; the awn



Fig. 299.

about 3 lines long, curved downwards, with a minute hook at the tip.

Under hedges, on roadsides, banks, and margins of woods, common in the greater part of Europe and Russian and central Asia, but not a high northern plant, and only as an introduced plant in North America. Abundant in England, Ireland, and southern Scotland, but apparently becoming scarce towards the north.

2. Water Avens. *Geum rivale*, Linn. (Fig. 300.)

(Eng. Bot. t. 106.)

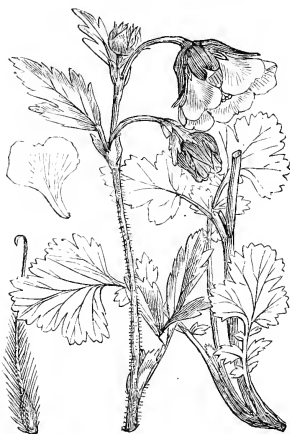


Fig. 300.

Rootstock often shortly creeping. Stems erect or ascending, usually simple, shorter than in the *common A.* Leaves mostly radical, with one large, orbicular, terminal segment, coarsely toothed or lobed, or sometimes divided into 3, and a few very small segments lower down the stalk, all more hairy than in the *common A.* Flowers few, drooping, much larger than in the *common A.*; the petals less spreading, of a dull-purplish colour, with a tint of orange. Carpels very hairy, in a globular head, which is shortly stalked above the calyx.

In marshes and wet ditches, in Europe, Russian Asia, and northern America, extending into the Arctic regions, and almost confined to mountainous districts in southern Europe. Common in northern England, Scotland, and Ireland, but rare in southern England. *Fl. summer.* Where this and the *common A.* grow together, specimens are occasionally found

which partake of the characters of both, approaching sometimes more nearly to the one, sometimes to the other. They have been described as a species under the name of *G. intermedium*, but they are more generally believed to be mere accidental hybrids between the two species.

V. RUBUS. RUBUS.

Herbs, with a perennial stock, or more frequently weak, scrambling, prickly shrubs; the leaves pinnately or palmately divided into distinct segments or leaflets, or rarely simply lobed. Calyx free, 5-lobed. Petals 5. Stamens numerous. Fruit a kind of granulated berry, formed by the union of numerous 1-seeded succulent carpels round the conical or shortly oblong, dry receptacle.

A large genus, widely distributed over almost every part of the globe. The fruit, analogous in some respects to that of a *Mulberry*, is sufficient to distinguish it at once from all other *Rosaceæ*. In the *Mulberry* however each granule is formed by a separate flower, whilst in *Rubus* the whole fruit proceeds from a single one. From the *Strawberry* it differs in that the carpels are succulent on a dry receptacle, whilst in the *Strawberry* the carpels are dry, and the receptacle succulent.

Flowering stems biennial or perennial, woody at least at the base, 2 or more feet long. Stipules subulate.

Lower leaves pinnate, with 5 leaflets. Rootstock creeping 1. *Raspberry R.*

Leaves of 3 leaflets, or, if of 5, the 4 lower proceed from the same point.

Branches slender, glaucous. Fruit covered with bluish

bloom 3. *Dewberry R.*

Branches not glaucous. Fruit black, without bloom . 2. *Blackberry R.*

Flowering stems herbaceous, very short, or seldom a foot high. Stipules ovate or lanceolate.

Leaves with 3 leaflets. Flowers small, axillary 4. *Stone R.*

Leaves undivided. Flowers large, terminal, solitary . . 5. *Cloudberry R.*

The *Virginian Raspberry*, often cultivated in shrubberies, is the *R. odoratus* from North America. The *Arctic R.* (*R. arcticus*, Eng. Bot. t. 1585), a low plant, with a creeping rootstock, and short herbaceous stems, like the *Cloudberry R.*, but with 3 leaflets and pink flowers, has been inserted in our Floras as having been found in the Scotch Islands, but this appears to be a mistake. At any rate, all recent search for it there has been in vain.

1. Raspberry *Rubus idæus*, Linn. (Fig. 301.)(Eng. Bot. t. 2442. *Raspberry*.)

Fig. 301.

Rootstock perennial and creeping; the flowering stems biennial, nearly erect, 3 or 4 feet high, more or less downy, and armed with weak prickles. Stipules small, subulate, often inserted some way up the leafstalk. Leaves pinnate; leaflets 5 in the lower leaves, often 3 only in the upper ones, ovate or oblong, pointed, coarsely toothed, of a light green above and whitish underneath. Flowers white, in long panicles at the ends of the short branches. Petals narrow and short. Fruit red, sometimes white in cultivation, usually separating from the receptacle when ripe.

In woods throughout Europe and Russian Asia. Generally distributed over Britain, but perhaps in some localities escaped from cultivation. *Fl.* spring or early summer.

2. Blackberry *Rubus fruticosus*, Linn. (Fig. 302.)(Eng. Bot. t. 715, 827, 2572, and Suppl. t. 2604, 2605, 2625, 2631, 2664, and 2714. *Bramble. Blackberry*.)

Rootstock perennial, without underground creeping shoots; the flowering stems biennial, or of few years' duration, sometimes nearly erect, but more frequently arched, straggling or prostrate, often rooting and forming fresh plants at the extremity, usually armed with prickles, either stout and hooked or thin and straight, with stiff hairs, or glandular bristles, or a short down, all variously intermingled or occasionally wanting. Stipules subulate or linear, inserted a short way up the leafstalk. Leaflets rather large, and coarse, either 3 or 5, the 2 or 4 lower ones inserted together at some distance below the terminal one, ovate, toothed, more or less downy, the midribs as well as the stalks usually armed with small hooked prickles. Flowers white or pink, in panicles at the ends of the branches. Fruit black, or very rarely dull-red, not separating readily from the receptacle, the calyx usually turned down under it, seldom closing over it as in the *Dewberry R.*

In hedges, thickets, woods, and waste places, over nearly the whole of Europe, Russian and central Asia, and northern Africa, but not a high alpine nor an Arctic species. Abundant in Britain. *Fl. summer, commencing early.* It varies considerably, especially in the prickles and hairs, and in the shape of the leaflets, and from its propagating so readily by its rooting stems, individual variations are often extensively multiplied, and acquire an undue importance in the eyes of local observers. The consequence has been an excessive multiplication of supposed species, both in Britain and on the Continent, although scarcely any two writers will be found to agree in the characters and limits to be assigned to them. Amongst those which have been observed in Britain, the following appear to be the most marked, although even these will very frequently be found to pass imperceptibly one into the other.



Fig. 302.

a. *Common Blackberry* (*R. fruticosus communis*). Leaflets covered underneath with a close, white down. Flowers usually numerous. Chiefly in hedges and thickets.

b. *Hazel-leaved B.* (*R. f. corylifolius*). Leaflets green underneath, usually large and broad. Flowers not so numerous as in the *common B.* In hedges and thickets with the *common B.*, but usually flowering earlier.

c. *Hornbeam-leaved B.* (*R. f. carpinifolius*). Leaflets green underneath, but not so broad, and more pointed than in the last, the stems more hairy. Flowers not numerous. Chiefly in woods.

d. *Glandular B.* (*R. f. glandulosus*). Leaflets as in the last variety, or sometimes broader, the stems with numerous stiff, glandular hairs mixed in with the prickles. More frequent in shady woods than in open thickets.

e. *Suberect B.* (*R. f. suberectus*). Leaflets green, or slightly hoary underneath. Stems shorter, and more erect than in the common forms. Flowers usually few, and the fruit not so black. Occasionally found in wet woods and thickets.*

* For further details see Hooker and Arnott's 'British Flora,' 7th edit., pp. 121 to 130, where the *Blackberry* and *Dewberry* are described as either one, seven, or twenty-one species; or Babington's 'Manual,' 4th edit., p. 96, where thirty-six species are admitted.

3. Dewberry Rubus. *Rubus cæsius*, Linn. (Fig. 303.)

(Eng. Bot. t. 826. *Dewberry*.)



Fig. 303.

Very near the *Blackberry R.*, but distinguished by the more slender branches, more or less glaucous when young, spreading, or creeping along the ground, and seldom arched; the flowers few, in small, loose panicles; the divisions of the calyx narrow, with much longer points, closing more or less over the fruit; and especially by the glaucous bloom covering the fruit when ripe. Leaves pale-green on both sides. Prickles usually small, with few or no hairs intermingled.

In open fields and stony wastes, seldom penetrating into woods, or climbing up into hedges, extending over Europe and Russian Asia, but not an Arctic plant. Common in Britain. *Fl. summer*.

It is believed by some botanists to be as much connected with the *Blackberry* by

intermediate forms as some of the above-enumerated varieties of that species are with each other, but generally speaking it is not difficult to distinguish it.

4. Stone Rubus. *Rubus saxatilis*, Linn. (Fig. 304.)

(Eng. Bot. t. 2233.)

The rootstock emits a few creeping runners rooting at the nodes, and erect or ascending simple stems seldom above a foot high, slender and downy, with a few small prickles, or sometimes wholly unarmed. Stipules ovate-oblong or lanceolate, scarcely adhering to the leafstalk. Leaflets usually 3, much like those of the *Dewberry R.*, thin, and of a pale-green. Flowers on slender pedicels, 2 or 3 together in the axils of the upper leaves, forming very short racemes or corymbs, seldom growing out into short, leafy, flowering branches. Petals of a dirty white or greenish-yellow, and very narrow. Berries red, with very few rather large carpels.

In open woods, diffused over the mountain regions of Europe and central and Russian Asia; more abundant, and descending to lower elevations in more northern latitudes. Frequent in Scotland, in the north of England, and along the western counties to South Wales; in Ireland, chiefly in the north. *Fl. summer.*

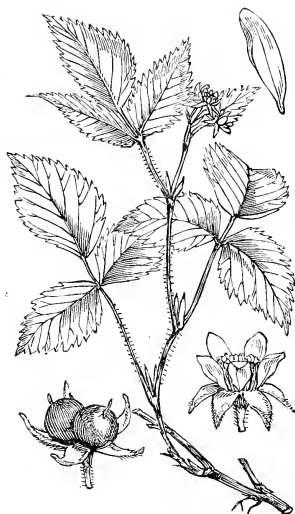


Fig. 304.

5. Cloudberry *Rubus Chamæmorus*, Linn. (Fig. 305.)

(Eng. Bot. t. 716. *Cloudberry.*)

Rootstock creeping. Stems simple, herbaceous, and unarmed, seldom above 6 inches high. Lower stipules entire, in a short sheath, without leaves; upper ones distinct, small, and ovate. Leaves few, rather large, simple, broadly orbicular or reniform, toothed, and often more or less deeply cut into 5, 7, or 9 broad lobes. Flowers white, rather large, solitary on terminal peduncles. Fruit rather large, of an orange-red.

In turfy bogs, in northern Europe, Asia, and America, generally at high latitudes, but descending southwards into northern Germany. Abundant in Scotland, and extends also into northern England, Wales, and Ireland. *Fl. summer.*



Fig. 305.

VI. **STRAWBERRY.** FRAGARIA.

Habit, foliage, and flowers of *Potentil*, but the fruit is succulent, formed of the enlarged succulent receptacle, studded on the outside with the numerous minute, 1-seeded carpels, looking like seeds.

A genus spread over nearly the whole of the northern hemisphere without the tropics, where it consists, perhaps, but of a single species, and represented again by a nearly allied but possibly distinct species in southern extratropical America.

1. **Common Strawberry.** *Fragaria vesca*, Linn. (Fig. 306.)

(Eng. Bot. t. 1524, and Suppl. t. 2742. *Strawberry*.)

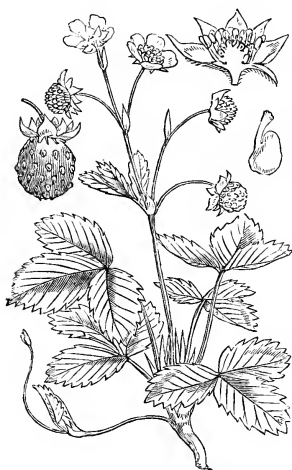


Fig. 306.

A short, perennial, tufted stock often emits slender runners, rooting and forming new plants at every node. Leaves mostly radical, more or less clothed with soft, silky hairs, consisting of 3 ovate, toothed leaflets at the end of a long leafstalk. Flower-stems radical, erect, leafless, or with 1 or 2 usually undivided leaves, 3 to 6 inches high or rarely more, bearing a small number of pedicellate white flowers. Fruit usually red.

In woods, bushy pastures, and under hedges, throughout Europe and Russian and central Asia, and in northern America, extending to the Arctic regions. Abundant in Britain. *Fl. nearly the whole season.* The *Hautboy*, a rather taller variety, with fewer runners and flowers, usually entirely or partially unisexual, has been distinguished as a species under the name of *F. elatior* (Eng. Bot. t. 2197); and several other wild or cultivated varieties have been proposed as species, but the great facility with which fertile cross-breeds are produced, gives reason to suspect that the whole genus, including even the Chilean *Pine Strawberry*, may prove to consist but of one species.

VII. **POTENTIL.** POTENTILLA.

Herbs, with a perennial, tufted stock, and occasionally a creeping rootstock or runners. Flowering stems usually annual, often very

short, rarely perennial or partially shrubby. Leaves of 3 or more digitate or pinnate, distinct segments or leaflets. Peduncles 1-flowered, solitary or forming a dichotomous cyme at the ends of the stem. Calyx free, *double*, that is, of twice as many divisions as there are petals, the alternate ones outside the others and usually smaller. Petals 5 or rarely 4. Stamens numerous. Carpels numerous, small, 1-seeded and seed-like, crowded on a receptacle which enlarges but slightly, and rarely becomes spongy, never succulent.

The species are numerous, extending over the whole of the northern hemisphere without the tropics, especially in Europe and Asia, penetrating into the Arctic regions, and descending along the mountain-ranges of America to its southern extremity. The genus, already extended by the admission of *Tormentilla* and *Comarum*, would, perhaps, be still better defined if the *Strawberry* and *Sibbaldia* were likewise included. It would then comprise all *Rosaceæ* with a double calyx, numerous, distinct, 1-seeded carpels, not enclosed in its tube, and the styles not transformed into long, feathery beaks or awns.

Leaves digitately divided.

Flowers white 1. *Strawberry-leaved P.*

Flowers yellow.

Petals 4 in all, or nearly all, the flowers . . . 3. *Tormentil P.*

Petals 5 in all, or nearly all, the flowers

Leaves very white underneath . . . 4. *Hoary P.*

Leaves green on both sides.

Stems creeping, and rooting at the nodes . . . 2. *Creeping P.*

Stems short and tufted or procumbent,

but not rooting 5. *Spring P.*

Leaves pinnately divided.

Flowers dingy-purple 9. *Marsh P.*

Flowers white 8. *Rock P.*

Flowers yellow.

Stem much branched, often shrubby. Leaflets

few, oblong 6. *Shrubby P.*

Stem creeping. Leaflets numerous, silky under-

neath 7. *Goose P.*

Two red-flowered, East Indian species, with digitate leaves, *P. nepalensis* and *P. atropurpurea*, and several of their hybrids, are frequently to be met with in our gardens.

1. Strawberry-leaved Potentil. *Potentilla Fragariastrum*, Ehrh. (Fig. 307.)

(*Fragaria sterilis*, Eng. Bot. t. 1785.)

Resembles the *Strawberry* in its short, tufted stems, silky hairs, 3 leaflets regularly toothed almost all round, and white flowers; but the

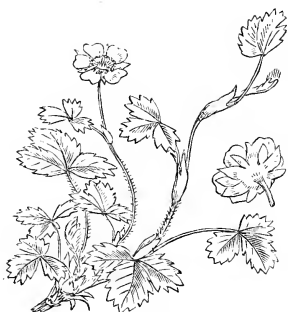


Fig. 307.

receptacle does not swell or become succulent as the fruit ripens. The stem itself is also often shortly creeping, either under or above ground, and the flowering branches are less erect than in the *Strawberry*; the petals usually smaller, although variable, sometimes narrow and scarcely so long as the calyx, sometimes nearly as large as in the common wild *Strawberry*.

On banks, dry pastures, and in open woods, in western and central Europe, extending northward to south Sweden, and eastward to the Crimea and the Caucasus. Abundant in England, Ireland, and southern Scotland, but becoming rare in the Highlands. *Fl. early spring*.

2. Creeping Potentil. *Potentilla reptans*, Linn.

(Fig. 308.)

(Eng. Bot. t. 862. *Cinquefoil*.)



Fig. 308.

Stock seldom much tufted, with slender, prostrate stems, often rooting at the nodes, and sometimes extending to a considerable length. Stipules ovate, mostly entire. Leaves all stalked, with 5 obovate or oblong, coarsely toothed leaflets. Flowers single, on long peduncles, apparently axillary, or rarely forming a loose, terminal cyme, as in the *Tormentil* *P.* Petals large and yellow, mostly 5, but occasionally only 4.

In rich pastures, borders of meadows, edges of woods, and hedges, throughout Europe and Russian Asia, except the extreme north. Abundant in England and Ireland, but decreasing much in Scotland. *Fl. summer and autumn*. Much as the common form of this species differs from the following one, it is by some supposed to be a mere variety, and certainly the procumbent variety of the true *Tormentil* appears to be intermediate between the two.

3. **Tormentil Potentil.** *Potentilla Tormentilla*, Sibth.
(Fig. 309.)

(*Tormentilla officinalis*, Eng. Bot. t. 863.)

Rootstock thick and woody. Stems erect, or procumbent at the base, several times forked, more or less silky-hairy as well as the leaves. Lower leaves often shortly stalked, and like those of the *creeping P.*, but the upper ones always sessile, consisting of 3, or rarely 5, deeply-toothed leaflets. Peduncles in the forks of the stem, or in the axils of the upper leaves, forming a loose, leafy, terminal cyme. Flowers small, bright yellow, and mostly with 4 petals; the first one, however, of each stem has occasionally 5.

On heaths, moors, and pastures, in open woods, etc., throughout Europe and Russian Asia, to the Arctic regions. One of the most abundant and most generally diffused British plants. *Fl.*

summer. The *Tormentilla reptans* (Eng. Bot. t. 864) is a more procumbent variety, occasionally creeping at the base, with rather larger flowers, more frequently breaking out into 5 petals, and forms some approach to the *creeping P.*; but the really intermediate forms mentioned above are of very rare occurrence.



Fig. 309.

4. **Hoary Potentil.** *Potentilla argentea*, Linn. (Fig. 310.)

(Eng. Bot. t. 89.)

Stems decumbent at the base, ascending, and forked above. Lower leaves on long stalks, the upper ones nearly sessile, composed of 5 wedge-shaped or sometimes obovate leaflets, with a very few deep teeth or lobes, and remarkable for the close white down which covers their under side as well as the stems. Flowers in a loosely forked, leafy corymb or panicle, rather small, with 5 yellow petals.



Fig. 310.

In gravelly pastures, and on roadsides, in northern and central Europe, extending all across the Asiatic continent, but neither an Arctic nor generally a Mediterranean plant. In Britain, sparingly distributed over England, Ireland, and a portion of Scotland. *Fl. summer.*

5. Spring Potentil. *Potentilla verna*, Linn. (Fig. 311.)

(Eng. Bot. t. 37.)



Fig. 311.

Stems generally short and tufted, sometimes procumbent at the base, and ascending above to the height of 6 or 8 inches, or shortly prostrate, but not rooting at the nodes as in the *creeping P.* Lower leaves on long stalks, with 5 or 7 obovate or oblong, toothed leaflets; the upper ones shortly stalked or nearly sessile, with 5 or rarely only 3 leaflets, all green on both sides, although sometimes greyish by the abundance of silky hairs. Flowers irregularly paniced at the ends of the short, weak stems; the petals yellow, broad, and longer than the calyx.

In pastures and waste places, chiefly in hilly and mountain districts, in Europe, and central and Russian Asia, extending to the Arctic regions, but grows also in the dry, hot regions of southern Europe. Thinly scattered over England and Scotland, chiefly in hilly districts, and not recorded from Ireland. *Fl. spring and summer.* It varies much in size and hairiness, and in the size of the flowers. A luxuriant mountain-variety, with larger flowers, of a golden-yellow, has been distinguished as a species, under the name of *P. alpestris* or *P. aurea* (Eng. Bot. t. 561).

6. **Shrubby Potentil.** *Potentilla fruticosa*, Linn. (Fig. 312.)
(Eng. Bot. t. 88.)

Differs from all other European species by the stem, the lower portion of which becomes woody, forming an erect or spreading shrub or undershrub, often very low, but sometimes attaining 2 feet in height; the short flowering-branches die down as in other *Potentils*. Stipules narrow and thin. Leaflets usually 5, narrow and entire; the three upper ones often shortly connected at the base; the two lower inserted at some distance from them, so as to form a pinnate rather than a digitate leaf. Peduncles terminal or opposed to the leaves, each with a single, rather large, yellow flower.

In bushy or stony places, chiefly in mountain districts, widely diffused over Europe, central and Russian Asia, and North America, but not generally common. In Britain, only in a few localities in the north of England, and in Clare and Galway in Ireland. *Fl. summer.*



Fig. 312.

7. **Goose Potentil.** *Potentilla anserina*, Linn (Fig. 313.)
(Eng. Bot. t. 861. *Silver-weed*.)

Stock tufted, with long creeping runners rooting at the nodes, as in the *creeping P.* Leaves pinnate, with numerous oblong, deeply toothed leaflets, green or somewhat silky on the upper side, of a shining silver-white underneath from the silky down with which they are covered. Peduncles long, solitary at the rooting nodes, bearing a single, rather large, yellow flower.

Common on roadsides, in stony pastures, and waste places throughout Europe, Russian and central Asia, and a great part of North America, extending to the Arctic regions, and reappearing in the southern hemisphere. Abundant in Britain. *Fl. summer.*



Fig. 313.

8. Rock Potentil. *Potentilla rupestris*, Linn. (Fig. 314.)

(Eng. Bot. t. 2058.)



Fig. 314.

Stock perennial, sometimes forming a very short, woody stem, the annual flower-stems 6 to 10 inches high. Leaves chiefly radical, pinnate; the common stalk rather long; the leaflets 5 or rarely 7, ovate, toothed, green, and somewhat glutinous. The stem-leaves few and smaller, usually with only 3 leaflets. Flowers few, rather large, of a pure white, forming a loose, irregular corymb.

In clefts of rocks, in limestone districts, in the mountain-ranges of central and southern Europe, and across the whole continent of Asia, extending northwards into southern Sweden. In Britain, only on the Breiddin hills in Montgomeryshire, except where it may have established itself for a time in the neighbourhood of gardens in which it has been cultivated. *Fl. May and June.*

9. Marsh Potentil. *Potentilla Comarum*, Nestl. (Fig. 315.)(*Comarum palustre*, Eng. Bot. t. 172.)

Fig. 315.

A perennial, 1 to 1½ feet high, often assuming a bluish-purple colour, glabrous or more or less hairy in the upper part; the stems decumbent and rooting at the base. Stipules not distinct from the enlarged base of the leaf-stalk. Leaflets mostly 5, shortly pinnate at the end of the stalk, oblong, toothed, nearly glabrous above and hoary underneath, or softly hairy on both sides, and often near 2 inches long. Flowers in a loose, irregular corymb, of a dingy purple; the inner segments of the calyx broad, with long points, the outer ones narrow and much smaller. Petals shorter than the calyx. Carpels numerous and small, on a somewhat en-

larged, rather spongy receptacle, on which account this plant is often considered as forming a distinct genus, under the name of *Comarum*.

In marshes, peat-bogs, and wet places, in northern and central Europe, Asia, and a portion of North America, penetrating far into the Arctic regions. Widely distributed over Britain, but rare in the south of England. *Fl. summer*.

VIII. **SIBBALDIA.** *SIBBALDIA.*

Habit and characters of *Potentil*, except that the number of stamens and carpels is reduced below 10, generally from 5 to 7. The genus consists but of very few species, small alpine plants, inhabiting the great mountain-ranges both of the new and the old world.

1. **Procumbent Sibbaldia.** *Sibbaldia procumbens*, Linn.

(Fig. 316.)

(Eng. Bot. t. 897.)

The perennial stock forms a short, dense, spreading tuft. Leafstalks seldom above 6 lines long, with 3 obovate or wedge-shaped leaflets, 3-toothed at the end, green, and more or less hairy on both sides. Flower-stems $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, almost leafless, bearing a cyme of small flowers, of which the green calyxes are the most conspicuous, the petals being very small and of a pale-yellow, or occasionally wanting. The lobes of the calyx often close over the carpels after flowering, but the latter are not enclosed within the tube as in *Alchemil*.



Fig. 316.

In the mountains of northern and Arctic Europe, Asia, and America, or, at greater elevations, in the higher ranges of central Europe and Asia. Frequent in the Scotch Highlands, constituting in some places a considerable portion of the greensward, but unknown in England or Ireland. *Fl. summer*.

IX. **ALCHEMIL.** ALCHEMILLA.

Tufted herbs, either annual or with a perennial, almost woody stock, and annual flowering-stems, palmately lobed or divided leaves, and small green flowers, in loose panicles or in small sessile heads. Calyx free, *double*, that is, of 8 divisions, of which 4 alternate ones are outside and smaller. No petals. Stamens 4 or fewer. Carpels 1 or 2, 1-seeded, and enclosed in the dry tube of the calyx.

The species are very few, but widely spread over the northern hemisphere, chiefly in mountainous districts. The palmate, not pinnate leaves, and inflorescence, readily distinguish them from the two following apetalous genera.

Perennial. Flowers in terminal panicles.

Leaves green on both sides, with short, broad, palmate lobes 1. *Common A.*

Leaves silvery shining underneath, deeply palmate . . . 2. *Alpine A.*

Small annual. Flowers minute, in sessile axillary heads . . . 3. *Field A.*

1. **Common Alchemil.** *Alchemilla vulgaris*, Linn.

(Fig. 317.)

(Eng. Bot. t. 597. *Lady's-mantle*.)



Fig. 317.

A perennial, either glabrous or more or less hairy, but always green, not silvery. Radical leaves large, on long stalks, broadly orbicular or reniform, divided only to a fourth or a third of their depth into 7 or 9 broad, regularly-toothed lobes. Flowering-stems decumbent or ascending, seldom above 6 inches high, bearing a few small leaves on short stalks, with large, green, toothed stipules, and a loose panicle of small, green flowers, each borne on a little pedicel, generally at least as long as the tube of the calyx.

In meadows and pastures, in northern and Arctic Europe and Asia, becoming more restricted to mountain-ranges in central and southern Europe and central Asia. Generally distributed over Britain, but scarce in south-eastern England. *Fl.* spring and summer.

2. Alpine Alchemil. *Alchemilla alpina*, Linn. (Fig. 318.)

(Eng. Bot. t. 244. *A. conjuncta*, Bab. Man.)

An elegant plant, with much of the general habit of the *common A.*, but known at once by the shining silvery hairs, which cover the stems and under side of the leaves. The stock often emits short, creeping runners. Leaves smaller than in the *common A.*, and divided to the base, or nearly so, into 5 or 7 oblong, almost entire segments. Flowers in little, dense corymbs, which form short, interrupted spikes or panicles at the ends of the branches.

In the principal mountain-ranges of Europe, but generally at greater elevations than the *common A.*, and in Asia and America almost restricted to the Arctic regions. Abundant in many parts of the Scotch Highlands and of northern England, and occurs also in the mountains of Kerry and Sligo in Ireland. *Fl. summer.*



Fig. 318.

3. Field Alchemil. *Alchemilla arvensis*, Scop. (Fig. 319.)

(Eng. Bot. t. 1011. *Parsley Piert.*)

A little annual, so different in appearance from the last two that it has often been considered as forming a distinct genus, but the essential characters are the same as in *Alchemil.* It is seldom more than 2 or 3 inches high, and often in full flower at 1 inch, much branched, green, and softly hairy. Leaves on short stalks, orbicular, more or less deeply divided and cut. Flowers very minute, green, and sessile, forming little heads in the axils of the leaves, half enclosed in the leafy stipules.

In fields and waste gravelly places, on earthy wall-tops, etc., throughout



Fig. 319.

Europe and western Asia, and carried by cultivation into other countries. Abundant in Britain. *Fl. the whole season.*

X. SANGUISORB. SANGUISORBA.

Herbs, with a perennial stock, annual, erect, or ascending stems, and pinnate leaves. Flowers in dense oval or cylindrical heads, at the ends of long peduncles. Calyx simple, of 4 coloured lobes, the tube enclosed in 2 or 4 bracts. Petals none. Stamens few. Carpels 1 or rarely 2, 1-seeded, enclosed in the dry, oblong tube of the calyx.

The genus consists but of very few European, North Asiatic, and North American species. They are closely allied to the following one, with which they are popularly included under the name of *Burnet*, the chief distinction being in the small number of stamens, and the flowers usually hermaphrodite.

1. Burnet Sanguisorb. *Sanguisorba officinalis*, Linn. (Fig. 320.)

(Eng. Bot. t. 1312. *Great Burnet.*)



Fig. 320.

A glabrous and erect perennial, attaining about 2 feet in height. Leaves chiefly radical or from the lower part of the stem, with 9 to 13 ovate or oblong, toothed segments; the upper part of the stem almost leafless, and divided into 3 or 4 long peduncles, each terminated by a single head of flowers, at first globular, then ovoid or oblong, rarely an inch long. Flowers much crowded, and more or less tinged with dark purple. Stamens usually 4.

In moist meadows, chiefly in mountainous districts, almost all over Europe and Russian Asia to the Arctic Circle. In Britain, chiefly in southern Scotland, and in northern and western England; not recorded from Ireland. *Fl. summer.*

XI. **POTERIUM.** POTERIUM.

Herbs, with a perennial stock, ascending or erect annual stems, and pinnate leaves. Flowers without petals, in dense, globular or ovate heads at the ends of long peduncles, as in *Sanguisorb*, but most frequently monœcious. Calyx in the males 4-lobed, the stamens numerous, with long filaments. Calyx in the females tubular, contracted at the mouth, with 4 small deciduous teeth. After flowering it becomes quadrangular, closely enclosing 1 or rarely 2 one-seeded carpels.

A small genus, chiefly south European and western Asiatic, generally preferring drier and more rocky situations than the *Sanguisorbs*.

1. **Burnet Poterium.** *Poterium Sanguisorba*, Linn.

(Fig. 321.)

(Eng. Bot. t. 860. *Salad Burnet.* *Garden Burnet.*)

A glabrous or very slightly downy perennial, much like the *Sanguisorb* but smaller, the stem seldom above a foot high. Leaflets small, ovate, deeply toothed, often 15 to 19 to each leaf. Heads of flowers smaller and more globular than in the *Sanguisorb*, of a light green colour, very seldom acquiring a purplish tinge. Lower flowers all males, with the numerous stamens projecting in hanging tufts; upper flowers female, with a long style ending in a purple, tufted stigma. Ripe calyx from 1 to 2 lines long, more or less distinctly quadrangular, and irregularly wrinkled and pitted.

In dry pastures and clefts of limestone rocks, in central and southern Europe, and temperate Russian Asia, extending northwards into southern Sweden. In Britain, generally spread over the limestone districts of England and Ireland, but scarce in Scotland. The ripe calyx or fruit varies in size and in the prominence of the wrinkles, constituting, in the eyes of southern botanists, several distinct species; one of these, with the ripe calyx near 2 lines long, and very distinctly pitted and marked with little asperities, is usually inserted in our Floras under the name of *P. muricatum*.

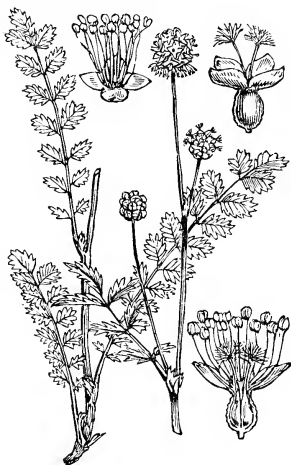


Fig. 321.

XII. **AGRIMONY.** AGRIMONIA.

Herbs, with a perennial stock, erect stems, pinnate leaves with distinct segments or leaflets, and yellow flowers in long, terminal, simple, loose spikes. Calyx 5-toothed. Petals 5. Stamens few. Carpels usually 2, enclosed within the dry, persistent calyx, which is covered, when ripe, with hooked bristles.

The genus comprises but very few European, north Asiatic, and North American species, easily known by their inflorescence, as well as by their fruit.

1. **Common Agrimony.** *Agrimonia Eupatoria*, Linn.

(Fig. 322.)

(Eng. Bot. t. 1335. *A. odorata*, Brit. Fl.)

Fig. 322.

Stems 2 or 3 feet high, more or less clothed, as well as the leaves, with soft hairs. Lower leaves often 6 inches long, with from 5 to 9 distinct, ovate, coarsely toothed leaflets, about an inch long, intermixed with a number of much smaller ones; the upper leaves gradually smaller, with fewer leaflets. Spike long and leafless, but each flower in the axil of a small 3-cleft bract, with two smaller 3-toothed bracteoles on the very short pedicel. Tube of the calyx hairy and erect when in flower, turned downwards after flowering, when it becomes thickly covered at the top with hooked, green or reddish bristles, forming a small burr. Petals rather small, oblong. Stamens short, often not more than 6 or 7, but sometimes twice that number.

On roadsides, waste places, borders of fields, etc., over nearly the whole of Europe, Russian Asia, and North America, but not an Arctic plant. Frequent in England and Ireland, but becoming scarce beyond the Clyde and Forth in Scotland. *Fl. all summer.* It varies considerably in the hairiness of the foliage, in the size of the flowers, and in the form of the ripe calyx, which is more or less contracted at the base, from obconical to campanulate; and from this character two European species have been distinguished, but the differences do not appear constant enough to separate them even as marked varieties.

XIII. ROSE. ROSA.

Erect, scrambling or climbing shrubs, more or less prickly with pinnate leaves, leafy stipules adhering to the leafstalk, and showy flowers, either solitary or in small corymbs at the ends of the branches. Calyx-tube globular or ovoid, contracted towards the top; the limb divided into 5 segments, often unequal, and sometimes lobed. Petals 5. Stamens numerous. Carpels several, 1-seeded, hairy, enclosed within the tube of the calyx, which becomes succulent when ripe, and sometimes slightly pulpy between the carpels, the whole forming a rather dry red or black berry.

A well-marked genus, widely diffused over the northern hemisphere, in the new world as well as the old. It comprises a considerable number of true species; but several of them being of very ancient and universal cultivation, and having been hybridized and multiplied with all the skill of modern horticulturists, their more or less marked races and varieties are now reckoned by thousands. Even in the wild state endeavours have been made to characterize so large a number of proposed species, that the confusion amongst them is almost as great as in the *Brambles*. The forms indigenous to Britain appear to be reducible to five types, which are probably real species. It must, however, be admitted, that the characters separating them are not so decided as could be wished, and that specimens will occasionally be found that the most experienced botanist will be at a loss to determine, and certainly not the less so if the number of British species be extended, as proposed, to 15 or 20.*

Prickles mostly straight, or very slightly curved, scarcely dilated at the base.

Stem seldom above a foot high when wild. Leaflets 7 or 9, usually small, and simply toothed 1. *Burnet R.*

Stem 2 feet or more. Leaflets 5 or 7, usually doubly toothed, downy on both sides 2. *Downy R.*

Prickles, at least the larger ones, more or less curved, and dilated at the base.

Styles slightly protruding from the mouth of the calyx in a dense tuft, but not united. Stem scarcely trailing.

Calyx-tube globular, more or less prickly or bristly . . . 2. *Downy R.*

* See Hooker and Arnott, 'British Flora,' 7th edit. pp. 137 to 141; and Babington's 'Manual,' 4th edit. pp. 110 to 113, where 19 species are described, in both cases from the careful observations of Mr. Borrer (Hook. Brit. Fl. ed. 1 and 2, pp. 223 to 242). The above number includes, however, the *R. Dicksoni* and *R. cinnamomea*, since admitted not to be British.

Calyx-tube ovoid or oblong, without prickles or bristles.

Leaflets very glandular, doubly toothed 3. *Sweetbriar R.*

Leaflets without glands, or very few on the edges only,
simply or rarely doubly toothed 4. *Dog R.*

Styles united in a column, protruding from the calyx.

Stem very trailing 5. *Field R.*

The most common exotic *Roses* in our cottage gardens are the *Cabbage* and *Moss Roses*, varieties of the *R. centifolia*, of uncertain origin (perhaps not distinct from the *R. gallica*, from central and southern Europe); the *Ayrshire Rose*, a cultivated variety of the south European *R. sempervirens*; and the *China Roses*, varieties of the Asiatic *R. indica*; but several other species from Europe, Asia, and North America, are also in general cultivation, and are among the parents of the numerous garden-hybrids.

1. Burnet Rose. *Rosa pimpinellifolia*, Linn. (Fig. 323.)

(*R. spinosissima*, Eng. Bot. t. 187. *R. involuta*, t. 2068? and *R. rubella*, t. 2521.)



Fig. 323.

A small, erect, very much branched shrub, usually under a foot high when wild, and seldom above 2 feet in cultivation, usually armed with numerous unequal, mostly straight, rather slender prickles, often more or less intermixed with glandular hairs. Leaflets small, 7 or 9 to each leaf, glabrous or with a minute glandular down; the teeth simple, or very rarely again toothed. Flowers rather small, white or pink, solitary at the end of the short branches; the floral stipules small. Calyx globular, or slightly ovoid, and smooth; the segments lanceolate, and almost always entire. Carpels all sessile, with free styles. Fruit black, or rarely red, globular or nearly so, crowned by the per-

sistent segments of the calyx.

In dry, bushy wastes, either near the sea or on dry, heathy hills, widely spread over Europe and temperate Asia, ascending occasionally to considerable elevations, but not extending to the Arctic regions. Common in Scotland and in several parts of England and Ireland, generally not far from the sea. *Fl. spring or early summer, and sometimes again later.* This is the origin of the *Scotch Roses* of our gardens.

2. Downy Rose. *Rosa villosa*, Linn. (Fig. 324.)

(Eng. Bot. t. 583. *R. mollis*, Eng. Bot. t. 2459, and *R. tomentosa*, Sm.)

In its ordinary state, this is distinguished from the downy varieties of the *dog R.* chiefly by the globular fruit, more or less covered with small, fine prickles, which are seldom entirely wanting. It is usually more erect and bushy, the prickles of the stem straight or but slightly curved; the leaflets softly downy on both sides, and almost always doubly toothed. Calyx-segments long, and often expanded near the top, sometimes all entire, sometimes, as in the *dog R.*, some of them more or less pinnately lobed. Flowers white or pale-pink.

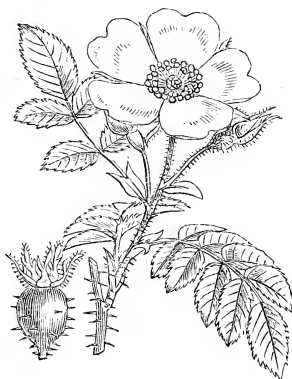


Fig. 324.

In hedges and thickets, in Europe and western Asia, and chiefly in the north, or in the mountain districts of the south. Generally distributed over Britain, but chiefly in Scotland, northern and western England, and Ireland. *Fl. early summer.* The *R. scabriuscula*, Eng. Bot. t. 1896, *R. hibernica*, t. 2196, *R. Sabini*, Suppl. t. 2594, and *R. Doniana*, Suppl. t. 2601, appear to be slight varieties of this species, to which belongs also the *Apple Rose* (*R. pomifera*), from continental Europe.

3. Sweetbriar Rose. *Rosa rubiginosa*, Linn. (Fig. 325.)

(Eng. Bot. t. 991. *R. micrantha*, t. 2490, and *R. sepium*, Suppl. t. 2653. *Sweetbriar*.)

Very nearly allied to the *dog R.*, but in its typical state, as cultivated in our gardens, easily recognized by the aromatic scent of the foliage when rubbed. This proceeds from small glands, copiously scattered on the leafstalks and under side and edges of the leaflets, often giving the foliage a rusty hue. In the wild state the scent is often very faint, although the glands are still numerous. The plant is usually more slender than the *dog R.*, the prickles curved or hooked, often intermixed with glandular hairs; the leaflets rather small, and almost al-



Fig. 325.

ways doubly toothed ; the flowers pink, usually solitary, rather smaller than in the *dog R.* Fruit ovoid or oblong, smooth or rarely bearing a very few small prickles.

In hedges and thickets, in central and southern Europe and central Asia, extending northwards into Scandinavia. In Britain, chiefly in southern and eastern England, apparently rare in northern and western England, Scotland, and Ireland. *Fl. early summer.*

4. Dog Rose. *Rosa canina*, Linn. (Fig. 326.)

(Eng. Bot. t. 992.)



Fig. 326.

Rootstock woody, frequently producing suckers. Stems of several years' duration, often the first year erect and simple to the height of 3 or 4 feet; the flowering stems of two or more years branched, rather weak and straggling, attaining 6 or 8 feet in length, usually glabrous, and without glands, armed with curved or hooked prickles. Leaflets 5 or sometimes 7, ovate, usually simply toothed and glabrous, or downy on the under side, and then often doubly toothed. Flowers pink or white, usually sweet-scented, solitary or 3 or 4 together at the ends of the branches ; the stipules of the undeveloped floral leaves forming elliptical bracts. Fruit ovoid or rarely globular, without bristles, although there are often a few on the pedicels ;

the 5 divisions of the calyx persistent, spreading or reflexed, either all dilated at the top and entire, or more frequently one pinnate on both sides, two on one side only, and the other two entire. Styles free, but collected in a dense hairy mass scarcely protruding from the orifice of the calyx-tube. Central carpels always distinctly stalked, according to Koch, a character which requires further verification.

In hedges and thickets, the commonest *Rose* throughout Europe and Russian Asia. Abundant in Britain. *Fl. summer, rather early.* It varies considerably in the foliage, either quite glabrous or more or less downy, especially underneath, and often glandular at the edges, but never so much so as in the *Sweetbriar R.*, nor so downy as in the *downy R.*, from which it is usually readily distinguished by the prickles and the fruit. The plants figured in 'English Botany' as *R. collina*, t. 1895, *R. cæsia*, t. 2367, *R. sarmentacea*, Suppl. t. 2595,

R. dumetorum, t. 2579 and Suppl. t. 2610, *R. Forsteri*, Suppl. t. 2611, and probably also *R. tomentosa*, t. 990, appear to be all reducible to the *dog R.*

5. Field Rose. *Rosa arvensis*, Linn. (Fig. 327.)

(Eng. Bot. t. 188.)

A much more trailing plant than the *dog R.*, often extending to many feet, with slender branches. Foliage and prickles nearly as in that species, but the leaflets are usually more glabrous and shining on the upper side, rarely slightly downy. Prickles usually small, and much hooked. Flowers white and scentless, usually 3 or 4 together at the ends of the branches, rarely solitary. Fruit globular or nearly so, without bristles; the calyx-divisions mostly entire, and falling off before the fruit is ripe. Styles usually united in a column protruding from the orifice of the calyx-tube, and the carpels all quite sessile, but neither of these characters appear to be quite constant.



Fig. 327.

In hedges and thickets with the *dog R.*, in western and central Europe, and often as common, but not extending so far to the north, nor apparently into eastern Europe. Abundant in England and Ireland, but becomes scarce in Scotland. *Fl. summer, lasting much later than the dog R.*

XIV. PYRUS. PYRUS.

Trees or shrubs, with entire or pinnately divided leaves, and showy flowers, either proceeding, with a few leaves, from buds or spurs on a former year's wood, or in simple or branched corymbs at the ends of the year's shoots. Calyx-tube adhering to the ovary, the limb with 5 small divisions. Petals 5. Stamens numerous. Styles 5 or fewer. Fruit forming with the calyx a fleshy mass, divided in the centre into 5 or fewer cells of a leathery or cartilaginous consistence, each cell containing one or two seeds or *pips*.

A genus of several species, widely spread over the northern hemi-

sphere, but chiefly in central Asia and southern Europe. This and the three following genera, although universally distinguished by modern botanists, are nevertheless separated only by characters of little importance and difficult to appreciate. The structure of the flowers is the same in all; the number of styles is variable, the distinction consists chiefly in the consistency of the lining of the cells of the ripe fruit. In *Pyrus* it is cartilaginous or leathery, so that the fruit can be cut across with a knife; in the three other genera the cells are hard and bony, and tend to separate from each other into distinct nuts. The following analytical Table includes the British species of all four.

Flowers solitary or few together, in simple bunches.

Leaves undivided.

Calyx-segments long and leafy. Flowers solitary,
sessile XVII. MEDLAR.

Calyx-segments small. Flowers several together.

Flowers small, drooping. Leaves entire, white
underneath XVI. COTONEASTER.

Flowers showy, erect. Leaves toothed.

Styles combined at the base. Fruit globular . . . 2. *Apple P.*

Styles distinct. Fruit pear-shaped 1. *Pear P.*

Flowers in branched corymbs. Leaves often cut or
divided.

Leaves simple, toothed, lobed, or pinnate at the base
only.

Leaves very white underneath, with a dense cotton . . . 3. *Beam P.*

Leaves green or loosely hairy underneath.

Leaves large, broad or almost cordate at the base,
more or less pinnately lobed 4. *Cut-leaved P.*

Leaves narrowed or wedge-shaped at the base,
3- or 5-lobed XV. HAWTHORN.

Leaves pinnately divided to the midrib into several
pairs of distinct, nearly equal segments or leaflets . . . 5. *Rowan P.*

Several others are cultivated in our gardens for their fruit or for ornament, especially the *Quince* (*P. Cydonia*), the *scarlet Pear* (*P. Japonica*), the *Siberian Crab* (*P. prunifolia*), etc.

1. Pear *Pyrus*. *Pyrus communis*, Linn. (Fig. 328.)

(Eng. Bot. t. 1784. *Pear-tree*.)

In favourable circumstances the *Pear* will form a handsome tree of considerable elevation, of a somewhat pyramidal shape, with dense foliage, and showing all its flowers on the outside; but it may often be seen as a low scrubby tree or mere bush. Leaves stalked, ovate or

obovate, simple, bordered with numerous small teeth, glabrous or loosely covered, when young, with a slight down. Flowers rather large, of a pure white, on pedicels of about an inch long, in very short racemes or bunches of 6 to 10, on the wood of a former year. Divisions of the calyx narrow and pointed. Styles long, and distinct from the base. The fruit is so well known as to have given its name to the peculiar shape it retains through nearly the whole of its numerous cultivated varieties.

In woods and hedgerows, in the temperate regions of Europe and Asia, extending northwards into southern Sweden. Scattered over Britain, but in so many instances escaped from cultivation, that it cannot be affirmed to be really indigenous. *Fl. spring.*



Fig. 328.

2. Apple *Pyrus*. *Pyrus Malus*, Linn. (Fig. 329.)

(Eng. Bot. t. 179. *Crab and Apple trees.*)

The *Apple-tree* never grows to the height of the *Pear*, and assumes a more spreading shape. The leaves are very nearly the same, but generally downy underneath, with a shorter and stouter stalk. The inflorescence is also the same, except that the peduncles issue from nearly the same point, instead of being arranged in a short raceme along a common axis; the divisions of the calyx are broader and downy, the flowers often assume a pinkish hue, the styles are shortly united at the base, and the fruit is nearly globular, and flat or hollowed at the base by the stalk.

As widely spread as the *Pear-tree* over Europe and western Asia, it extends further northward into Scandinavia. Equally scattered over Britain, but with more probability of its being a true native. *Fl. spring.* In a wild state it produces the



Fig. 329.

small acid fruit known under the name of *Crab-Apple*, but the *Apples*, *Pippins*, *Codlins*, etc., of our orchards all belong to the same species.

3. Beam Pyrus. *Pyrus Aria*, Ehrh. (Fig. 330.)

(Eng. Bot. t. 1858. *White Beam-tree*.)



Fig. 330.

Often a mere shrub, but growing into a tree of moderate size, with a rather broad head; the inflorescence, the young shoots, and the under side of the leaves covered with a soft, white cotton. Leaves ovate or obovate, green and glabrous on the upper side, always sharply toothed, sometimes undivided, sometimes more or less pinnately lobed; the lobes rounded at the top, and not acuminate as in the *cut-leaved P.* Flowers white, in corymbs at the ends of short, leafy branches, but not near so numerous as in the *Rowan-tree*, and rather larger, the lateral peduncles bearing seldom more

than 3 or 4. Styles usually 2 only. Berries globular or ovoid, and red.

In woods, in central Europe, and in the mountain-ranges of southern Europe and central Asia, extending eastward to the Altai and Himalaya, and northward into Scandinavia. Generally distributed over Britain, but more frequent in England and Ireland than in Scotland. *Fl. spring or early summer.* The cut-leaved varieties are sometimes considered as species, under the name of *P. intermedia* or *P. scandica*, when the lobes are not deep, and *P. pinnatifida* (Eng. Bot. t. 2331) or *P. fennica*, when the lower ones reach the midrib; the former is not uncommon in the north of Europe, and is occasionally found in Scotland; the other appears to be of garden origin.

4. Cut-leaved Pyrus. *Pyrus torminalis*, Ehrh. (Fig. 331.)

(*Cratægus*, Eng. Bot. t. 298. *Wild Service-tree*.)

A tall shrub or moderately-sized tree, with the inflorescence and under side of the leaves, when young, clothed with a loose down, which disappears as they grow old. Leafstalks slender; leaves broad, and divided to near the middle into a few broad, pointed lobes, bordered with small teeth. Flowers in corymbs at the ends of short leafy branches, white, fewer and larger than in the *Rowan P.*; more

numerous and rather smaller than in the *Beam P.* Styles usually 2, united to above the middle. Berries ovoid or globular, small and brownish.

In woods, in central and southern Europe to the Caucasus, scarcely extending into northern Germany. In Britain, only in southern and central England. *Fl. spring.*



Fig. 331.

5. Rowan Pyrus. *Pyrus Aucuparia*, Gært. (Fig. 332.)

(*Sorbus*, Eng. Bot. t. 337. *Rowan-tree* or *Mountain Ash*.)

A moderate-sized tree, distinguished from all the foregoing by the regularly pinnate leaves. Leaflets 11 to 19, in pairs along the common stalk, with a terminal one at some distance from the last pair; all narrow-oblong, toothed, from 1 to near 2 inches long, glabrous or nearly so above, more or less downy underneath. Flowers white, rather small, but very numerous, in showy corymbs at the ends of short leafy branches. Peduncles and calyx more or less downy. Styles rather short, usually 3, almost glabrous, and free from the base. Berries numerous, small, globular, of a bright red.

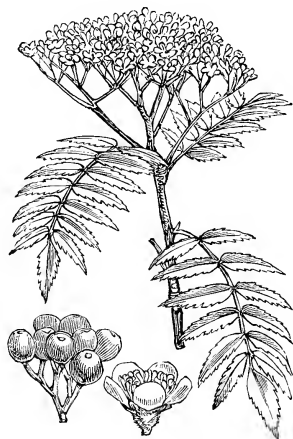


Fig. 332.

In woods, throughout Europe and Russian Asia, especially in mountainous districts and at high latitudes, where it shrinks into a stunted shrub. Generally distributed over Britain in a wild state, besides being much planted. *Fl. spring or early summer.*

The cultivated *Service-tree* (*Pyrus domestica*, Eng. Bot. t. 350) has precisely the foliage of the *Rowan P.*, of which it is believed by some to be a mere variety produced by cultivation. The flowers are rather larger and the styles often woolly, but the only real distinction is in the fruit, which is very much larger, assuming the form of a little pear. It has been inserted in British Floras on the strength of a single tree in the forest of Wyre, near Bewdley, which has, however, been shown to have been in all probability planted there.

XV. HAWTHORN. CRATÆGUS.

Shrubs, seldom growing into trees, mostly armed with stout thorns formed of abortive branches, and differing from *Pyrus* only in the hard bony consistence of the cells of the fruit.

The genus is, like *Pyrus*, spread over the temperate regions of the northern hemisphere, but the species are more numerous in North America than in Europe and Asia. Among those most frequently cultivated in our shrubberies and gardens are the *C. pyracantha* from south-eastern Europe, and the *C. Crus-galli*, and some other North American ones. The evergreen *C. glabra*, from China, now forms the genus *Photinia*.

1. Common Hawthorn. *Cratægus Oxyacantha*, Linn. (Fig. 333.)

(*Mespilus*, Eng. Bot. t. 2504. *Hawthorn*. *May*. *Whitethorn*.)



Fig. 333.

A thorny shrub or small tree, glabrous or more or less downy on the calyxes and young foliage. Leaves stalked, narrowed at the base, and more or less divided upwards into three or five lobes or segments, which are irregularly toothed or even lobed. Flowers white or pink, sweet-scented, in sessile corymbs on short leafy branches. Petals broad. Styles 1, 2, or 3. Fruit red, globular or ovoid, crowned by the short divisions of the calyx, and containing a hard, bony, 1- or 2-celled nut, each cell with a single seed.

In woods, thickets, and hedges, throughout Europe and central and Rus-

sian Asia, except the extreme north. Abundant in Britain, and universally cultivated for artificial hedges. *Fl. spring or early summer.* It varies much in the form of its leaves, the down of its foliage and calyx, the number of styles, and the colour and size of the flower and fruit.

XVI. COTONEASTER. COTONEASTER.

Shrubs, with leaves usually small and entire, and rather small flowers, either solitary on short peduncles, or 4 or 5 together, in short drooping racemes; the generic characters those of *Hawthorn*, except that the cells of the fruit form as many nuts, distinct from each other, but cohering to the inside of the fleshy calyx.

The species are few, chiefly from eastern Europe or central Asia, with a few North American ones.

1. Common Cotoneaster. *Cotoneaster vulgaris*, Lindl.

(Fig. 334.)

(Eng. Bot. Suppl. t. 2713.)

An irregularly-growing, tortuous shrub, with a dark ruddy bark; the young shoots and under side of the leaves covered with a short, dense, white cottony down. Leaves shortly stalked, small, ovate or orbicular, and entire, glabrous on the upper side. Flowers greenish-white, small, solitary or few together, in short drooping racemes, on very short leafy branches or buds. Calyx glabrous, with short broad teeth. Styles usually 3. Fruit small, reddish.

In rocky situations, chiefly in limestone regions, in central and southern, and especially eastern Europe, and in central and Russian Asia, extending in the east to the Arctic Circle, ascending high up into mountain ranges, even to the edges of glaciers. In Britain, only known on the limestone cliffs of the Great Orme's Head. *Fl. spring.*



Fig. 334.

XVII. **MEDLAR.** *MESPILUS.*

A single species, distinguished as a genus from *Hawthorn* on account of its large flowers with more foliaceous divisions to the calyx, and of its fruit, of which the bony cells are more exposed at the top of the fruit, and more readily separable from each other.

1. **Common Medlar.** *Mespilus germanica*, Linn. (Fig. 335.)

(Eng. Bot. t. 1523.)



Fig. 335.

A shrub or small tree, more or less thorny when wild, but losing its thorns in cultivation. Leaves undivided, nearly sessile, lanceolate or oblong, with very small teeth, usually downy, especially on the under side. Flowers large, white or slightly pink, solitary and sessile on short leafy branches. Styles glabrous and distinct, usually 5. Fruit nearly globular or pear-shaped, crowned by a broad hairy disk, from whence the 5 bony cells very slightly protrude.

In hedges and thickets, common in southern Europe to the Caucasus, extending more or less into central Europe, but in many cases only as escaped from cultivation. In Britain, apparently wild in several localities in southern England, but probably not truly indigenous. *Fl. spring.*

The *Calycanthus*, occasionally planted in shrubberies, and *Chimonanthus*, often trained against walls, belong to the small North American and Asiatic *Calycanthus* family, allied on the one hand to the *Rose* family, on the other to the *Magnolia* family. The common *Myrtle*, a south European shrub, is one of the very large tropical *Myrtle* family, with the indefinite perigynous stamens of the *Rosaceæ*, but with opposite leaves, and a completely syncarpous inferior ovary.

XXVI. THE *ÆNOTHERA* FAMILY. ONAGRACEÆ.

Herbs, or, in some exotic genera, shrubs, with the leaves, especially the lower ones, frequently opposite, almost always undivided (except when immersed in water), and toothed, without stipules. Flowers in terminal spikes or racemes, or the lower ones solitary in the axils of the leaves. Calyx-tube adhering to the ovary, sometimes prolonged considerably above it; the limb of 4 or sometimes 2 lobes, not overlapping each other in the bud. Petals as many, inserted on the calyx below its lobes, or occasionally wanting. Stamens 8, 4, 2, or 1, inserted with the petals. Styles simple or divided at the top into 2 or 4 stigmas. Ovary inferior, of 2 or 4 cells.

A considerable Order, ranging over the whole world, but in the greatest variety in North America. It is readily known amongst European Calyciflores with an inferior syncarpous ovary, by the parts of the flowers being all in twos or in fours. The small-flowered genera with sessile stigmas (of which *Myriophyll* and *Marestail* are the only British ones) form a distinct Suborder, sometimes considered as an independent Order, under the name of *Haloragææ*.

Style distinctly present.

Stamens 8. Petals 4.

Flowers purplish-red, pink, or white. Capsule long.

Seeds with a tuft of hairs. 1. *EPILOBE*.

Flowers large, yellow. Capsule short. Seeds without hairs

2. *ÆNOTHERA*.

Stamens 4. Petals small or none. Capsule short. Seeds without hairs.

3. *LUDWIGIA*.

Stamens 2. Petals 2, cleft. Capsule small, hispid. Seeds 1 or 2

4. *CIRCÆA*.

Stigma sessile on the ovary. Aquatic plants with minute flowers.

Stamens 4 or 8. Stigmas and seeds 4

5. *MYRIOPHYLL*.

Stamen, stigma, and seed 1

6. *MARESTAIL*.

The North American *Clarkias*, *Zauschneria* and *Gaura*, of our flower-gardens, and the South American *Fuchsias* of our plant-houses, all belong to the *Ænothera* family.

I. *EPILOBE*. *EPILOBIUM*.

Herbs, mostly erect, with annual flowering stems, either with a creeping perennial rootstock, or, in the small-flowered species, becoming

perennial by means of scions or offsets formed in autumn at the base of the decaying stem. Leaves opposite, or irregularly scattered. Flowers pink or red, rarely white. Limb of the calyx 4-cleft. Petals 4. Stamens 8. Ovary and capsule long and narrow, 4-celled. Style distinct, with a club-shaped or 4-lobed stigma. Seeds numerous, bearing a tuft of long hairs.

The genus is diffused over nearly the whole of the globe, from the extreme Arctic regions of both hemispheres to the tropics. The numerous forms the species assume in every variety of climate, make it exceedingly difficult to define them upon any certain principle, and botanists seldom agree as to the number they should admit. Those here adopted are the most marked among our British forms; but it must be confessed that in some instances intermediates are to be met with which will be found very puzzling. In all cases the style must be carefully observed, if possible when fresh, and a note made whether the stigma is entire or lobed.

Flowers somewhat irregular, in long, terminal, leafless racemes.

Petals spreading from the base, mostly entire 1. *Willow E.*

Flowers regular, axillary or in short racemes, leafy at the base.

Petals erect at the base, mostly notched.

Stigma deeply 4-lobed.

Stem often 3 to 4 feet. Flowers large. Leaves clasping the stem 2. *Great E.*

Stem seldom above 2 feet. Leaves, at least the lower ones, shortly stalked.

Leaves lanceolate, the middle ones sessile. Plant softly hairy 3. *Hoary E.*

Leaves ovate-lanceolate or ovate, mostly stalked. Plant glabrous or slightly hoary 4. *Broad E.*

Stigma club-shaped, entire (or very shortly 4-lobed in the pale E.).

Stem marked with two or four raised lines, decurrent from the lower or all the leaves.

Leaves shortly stalked. Buds erect or slightly nodding 5. *Pale E.*

Leaves lanceolate, sessile. Buds erect 6. *Square E.*

Stem cylindrical. Decurrent lines none or faint. Buds nodding.

Alpine plant, not 6 inches high. Leaves ovate.

Leaves small, mostly entire. Plant little-branched 9. *Alpine E.*

Leaves broad, toothed, an inch or more long. Plant much branched 8. *Chickweed E.*

Lowland plant, often a foot high or more. Leaves narrow, nearly entire 7. *Marsh E.*

1. Willow Epilobe. *Epilobium angustifolium*, Linn.
(Fig. 336.)

(Eng. Bot. t. 1947. *French Willow. Rose-bay.*)

A handsome plant, simple or scarcely branched, 2 or 4 feet high, glabrous or slightly hoary, but never hairy. Root-stock creeping. Leaves shortly stalked, lanceolate, entire or with very minute distinct teeth. Flowers large, purplish-red, in long terminal racemes; the petals slightly unequal, entire, and spreading from the base; the stamens and styles inclined downwards. Stigma deeply 4-lobed. Pod 1 to 2 inches long, more or less hoary.

On moist banks, and in moist open woods, chiefly in light soils, in Arctic and northern Europe, Asia, and North America, extending into the mountainous districts of central Europe and Asia. Widely spread over Britain, but not common, and in many places introduced. *Fl. summer.*



Fig. 336.

2. Great Epilobe. *Epilobium hirsutum*, Linn. (Fig. 337.)

(Eng. Bot. t. 838. *Great Willow-herb. Codlins-and-cream.*)

Stems stout and branched, 3 or 4 or even 5 feet high, the whole plant softly hairy. Leaves lanceolate, clasping the stem at the base, and bordered with small teeth. Flowers large and handsome; the petals erect at the base, spreading upwards, and deeply notched. Pod very long, quadrangular, and hairy.

On the sides of ditches and rivers, and in wet places, throughout Europe and central and Russian Asia, except the extreme north. Abundant in England, but soon disappearing in Scotland. *Fl. summer.*



Fig. 337.

3. Hoary Epilobe. *Epilobium parviflorum*, Schreb.
(Fig. 338.)

(Eng. Bot. t. 795.)



Fig. 338.

Some specimens of this plant look like the *great E.* on a small scale, others approach the *broad E.* It is distinguished from the former by its smaller stature and much smaller flowers. The lower leaves, also, and sometimes the upper ones, are shortly stalked; the middle ones usually sessile, but scarcely clasping the stem. From the *broad E.* there is little to separate it but the soft hairs with which it is clothed, the narrower leaves with shorter stalks, and the rather larger flowers. But none of these characters appear to be quite constant, and it may possibly prove to be a mere variety of the *broad E.*

In Europe and western Asia, but not so common as the *broad E.*, and generally found in wetter situations. It has nearly the same range over Britain, excepting the north of Scotland. *Fl. summer.*

4. Broad Epilobe. *Epilobium montanum*, Linn. (Fig. 339.)

(Eng. Bot. t. 1177.)

Stems erect, simple or slightly branched, from 6 inches to a foot or more high, cylindrical, without any decurrent lines or angles, and usually glabrous or slightly hoary; the autumnal offsets usually short, and sometimes sessile. Leaves shortly stalked, or sometimes almost sessile, ovate or broadly lanceolate, and toothed. Flower-buds erect or slightly nodding; ovary downy, tapering into a stalk at the base, and crowned by a calyx 2 or 3 lines long, divided below the middle into 4 reddish lobes. Petals pink, usually nearly twice as long, but sometimes scarcely exceeding the calyx, always deeply notched. Style divided at the top into 4 oblong, spreading, stigmatic lobes. Pod slender, 2 to 3 inches long.

In waste and cultivated places, roadsides, woods, etc., throughout Europe and Russian and central Asia, and apparently in many other parts of the globe. Very abundant in Britain. *Fl. summer*. It varies much in the size of the flowers, which are in dry situations often nearly as small as in the *pale E.*, from which it is then chiefly distinguished by the deeply-cleft stigma.

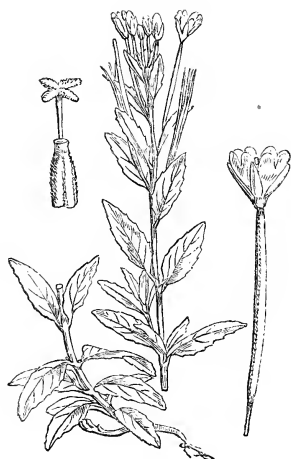


Fig. 339.

5. Pale Epilobe. *Epilobium roseum*, Schreb. (Fig. 340.)

(Eng. Bot. t. 693.)

An erect plant, glabrous or hoary when young, much resembling at first sight a small-flowered *broad E.*, but the leaves are narrower, on longer stalks, the lower ones generally opposite, with a raised line descending more or less along the stem from the junction of the leafstalk on each side, almost as in the *square E.* They vary from ovate-lanceolate to narrow-oblong, and from 1 to 3 inches in length. Flowers in a short, terminal, leafy, branched raceme or panicle; the limb of the calyx hardly 2 lines long, and the notched petals not much longer. Buds erect or slightly nodding, the style ending in a club-shaped stigma, either entire or very shortly 4-lobed. Pods from 1 to 2 inches long.



Fig. 340.

Along ditches, and in moist situations, in Europe and Russian Asia, but not so common as either the preced-

ing or the following species, nor extending so far to the north. Scattered over several parts of Britain, but being often confounded with the *broad E.* or the *hoary E.*, its real distribution is very uncertain. *Fl. summer.* Specimens in which the stigma is slightly lobed have been distinguished under the name of *E. lanceolatum* (Eng. Bot. Suppl. t. 2935, the style much more lobed than it should be).

6. Square Epilobe. *Epilobium tetragonum*, Linn.

(Fig. 341.)

(Eng. Bot. t. 1948. *E. obscurum*, Bab. Man.)

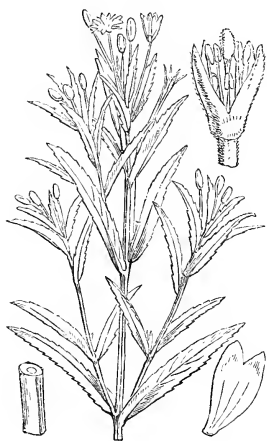


Fig. 341.

Stems erect, often much branched, 1 to 2 feet high, glabrous, or hoary with a very short down, and more or less angular from raised lines descending on each side from the margins of the leaves; the autumnal offsets often long and threadlike, with a fleshy bud at the extremity, more rarely short and scaly or leafy, as in the *broad E.* Leaves sessile or nearly so, narrow, and toothed. Flowers small, in terminal leafy racemes, the buds erect, the petals deeply notched. Stigma entire and club-shaped. Pod often very long.

In wet ditches and watery places, throughout Europe, Russian Asia, and a portion of North America, and extending to the Arctic Circle. Common in Britain, excepting in the north of Scotland. *Fl. summer.* Specimens with filiform scions have been distinguished under the name of *E. virgatum*.

7. Marsh Epilobe. *Epilobium palustre*, Linn. (Fig. 342.)

(Eng. Bot. t. 346.)

Very near the *alpine E.*, and by some believed to be a lowland form of it. It has the same slender scions, entire or not much toothed leaves, short terminal racemes, small flowers, nodding buds, and club-shaped, undivided stigma; but its stature is taller, often a foot or even two in height, and the leaves are longer and much narrower, often

linear. It sometimes also comes very near the narrow-leaved forms of the *pale E.* and the *square E.*, but has the buds much more nodding, and the decurrent lines on the stem are either very faint or entirely wanting.

In wet, boggy places, and watery ditches, throughout Europe and Russian Asia, but more especially in the north, extending into the Arctic regions. Generally distributed over Britain, but not a very common species. *Fl. summer.*

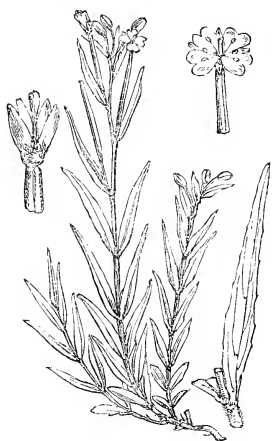


Fig. 342.

8. Chickweed Epilobe. *Epilobium alsinæfolium*, Vill.

(Fig. 343.)

(Eng. Bot. t. 2000.)

Closely allied to, and perhaps a mere variety of, the *alpine E.*, but much more luxuriant, and frequently branched, though seldom more than 6 inches high. Leaves very shortly stalked, ovate, and toothed, and an inch long or more, like those of the *broad E.*, but of a thicker consistence. Flowers larger than those of the *alpine E.* The autumnal scions are more frequently underground than green and leafy.

Along alpine rivulets and springs, in all the great mountain-ranges of Europe and western Asia. Very common in the Scotch Highlands, extending into the mountains of North Wales and north-western England, but not recorded from Ireland. *Fl. summer.*



Fig. 343.

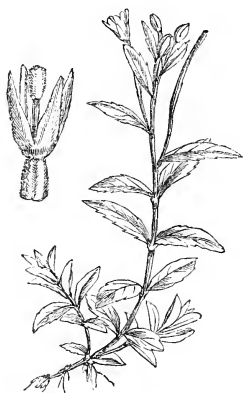
9. Alpine Epilobe. *Epilobium alpinum*, Linn. (Fig. 344.)(Eng. Bot. t. 2001. *E. anagallidifolium*, Bab. Man.)

Fig. 344.

This little plant is seldom more than 4 or 5 inches high, and often much shorter, decumbent and much branched at the base, glabrous or nearly so; the autumnal scions usually above ground, slender and leafy, rarely short and tufted. Leaves more or less stalked, small, ovate or lanceolate, usually obtuse, and entirely or obscurely toothed. The stems have not the raised decurrent lines of the *pale E.*, but are only marked occasionally with faint downy lines. The flowers, although as small as in the *marsh E.*, appear large in proportion to the size of the plant, they are few in the axils of the upper leaves, forming short, leafy racemes. Buds nodding. Petals

notched. Style ending in a club-shaped stigma, entire or nearly so. Pod 1 to 2 inches long, narrowed at the base into a long stalk.

Along alpine rills, and wet places in the high mountain-ranges or Arctic regions of Europe, Russian Asia, and northern America. Abundant in the Scotch Highlands, but very local in England, and does not extend into Wales or Ireland. *Fl. summer.*

 II. ŒNOTHERA. ŒNOTHERA.

Herbs or undershrubs, with alternate leaves, and yellow, red, or purple flowers, either axillary or in terminal spikes or racemes. Calyx-tube prolonged above the ovary, 4-lobed at the top. Petals 4. Stamens 8. Ovary and capsule 4-celled. Style distinct, with a capitate or 4-lobed stigma. Seeds numerous, without any tuft of cottony hairs.

A large American, and chiefly North American genus, from whence several species are cultivated in our flower-gardens.

1. Common Œnothera. *Œnothera biennis*, Linn. (Fig. 345.)(Eng. Bot. t. 1534. *Evening Primrose*.)

A biennial, 2 or 3 feet high; the stems almost simple, and more or less hairy: leaves ovate-lanceolate or lanceolate, slightly toothed,

hoary or downy. Flowers yellow, large, and fragrant, in a long, terminal spike, often leafy at the base. Ovary sessile, about 6 to 8 lines long, the tube of the calyx at least an inch longer, the petals broad and spreading. Capsule oblong.

A North American plant, long cultivated in European flower-gardens, and now naturalized on river-banks and other sandy places in several parts of western Europe. Appears to be fully established in Lancashire and some other counties of England. *Fl. summer and autumn, opening in the evening.*



Fig. 345.

III. **LUDWIGIA.** LUDWIGIA.

Marshy or almost aquatic herbs, with opposite leaves, and small flowers solitary in the axils of the upper leaves. Limb of the calyx of 4 short divisions. Petals very small, or, in the British species, none. Stamens 4. Ovary and capsule 4-celled. Style distinct, with a capitate stigma. Seeds numerous, without any tuft of hairs.

The genus consists of a considerable number of species, widely diffused over the hotter as well as the temperate regions of the globe, in the new world as in the old. In their general habit and small flowers they resemble *Peplis*, and some other semiaquatic plants of the *Lythrum* family, but the inferior ovary and other characters are entirely those of the *Oenothera* family.

1. Marsh Ludwigia. *Ludwigia palustris*, Ell. (Fig. 346.)

(*Isnardia*, Eng. Bot. Suppl. t. 2593.)

A small glabrous annual, 3 to 6 inches high or rarely more; the lower part of the stem creeping in mud or floating in water, branching and rooting at almost every node. Leaves ovate and entire, 6 lines to an inch long. Flowers closely sessile, with a small green calyx, no petals, very small stamens, and an exceedingly short style, with a comparatively large capitate stigma. The capsule rapidly enlarges, being,



Fig. 346.

when ripe, about 2 lines long, obovate, with 4 green angles, and containing numerous minute seeds.

In wet ditches, bogs, and pools, in central and southern Europe, central Asia, and North America, not crossing the Baltic to the northward. In Britain only known hitherto in three localities in Hampshire and Sussex, and in the Channel Islands. *Fl. summer.*

IV. **CIRCÆA.** CIRCÆA.

Herbs, becoming perennial by creeping rootstocks from the base of the erect annual flowering stems, with opposite stalked leaves, and small flowers in terminal racemes. Limb of the calyx of two divisions, turned back whilst flowering. Petals 2. Stamens 2. Style distinct, with a thick stigma. Ovary and capsule globular, pear-shaped, or oblong, 2- or 1-celled, with 1 seed in each cell.

This pretty little genus consists but of three or four species, spread over Europe, temperate Asia, and North America, all so nearly resembling each other, that, in the opinion of some botanists, they are mere varieties of one.

Plant more or less hairy. Capsule pear-shaped, with 2 seeds. 1. *Common C.*
Leaves perfectly glabrous. Capsule oblong, with 1 seed . . . 2. *Alpine C.*

1. **Common Circæa.** *Circæa lutetiana*, Linn. (Fig. 347.)

(Eng. Bot. t. 1056. *Enchanter's Nightshade.*)

Stems erect or shortly decumbent, and rooting at the base, 1 to 1½ feet high, and, as well as the leaves and racemes, more or less clothed with very short whitish hairs. Leaves on rather long stalks, broadly ovate or heart-shaped, 2 to 3 inches long, rather coarsely toothed, of a thin texture. Flowers white or pink, in elegant, slightly branched,

leafless, terminal racemes. Pedicels about 2 lines long, turned down after flowering. Capsule small, pear-shaped, covered with stiff, hooked hairs, forming a small burr. Seeds 2.

In woods and shady situations, throughout Europe and central and Russian Asia, except the extreme north, and in North America. Abundant in England and Ireland, but scarce in Scotland. *Fl. summer.*



Fig. 347.

2. Alpine *Circæa*. *Circæa alpina*, Linn. (Fig. 348.)

(Eng. Bot. t. 1057, *not good.*)

Closely resembles the common species, of which it may be a mountain variety, but is smaller in all its parts, and usually quite glabrous, except the fruit. It is seldom above 6 inches high; the leaves are thinner, and often glossy; the capsules smaller, less hairy, much narrower, and usually contain only a single seed, owing to the almost constant abortion of one of the cells.

In woods, and stony places, chiefly in mountain districts, in Europe and all across Russian Asia, often ascending to great altitudes, and penetrating further northward than the *common C.*, but apparently not an Arctic plant. Abundant in Scotland, extending into the north of England, but disappearing in the south; in Ireland both in the north and in Cork county. *Fl. summer.* A

larger variety has sometimes been described as a distinct species, under the name of *C. intermedia*, a name also occasionally given to smaller states of the *common C.*

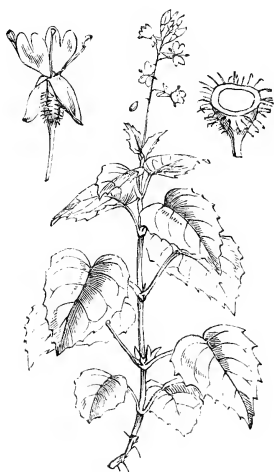


Fig. 348.

V. **MYRIOPHYLL.** MYRIOPHYLLUM.

Aquatic plants, with finely pinnated, whorled leaves, and minute, sessile, monœcious flowers. Calyx with 4 short divisions. Petals 4 in the male flowers, very minute or none in the females. Stamens in the males 8, 6, or 4. Ovary and capsule of the females short, divided into 4 cells, with 1 seed in each.

A small genus, widely diffused over almost every part of the globe. In its finely-cut whorled leaves it bears at first sight much resemblance to *Ceratophyll*, but the lobes of the leaves are pinnate, not repeatedly forked as in the latter plant.

- Floral leaves or bracts not longer than the flowers 1. *Spiked M.*
 • Floral leaves longer than the flowers, usually pinnate, like
 the stem-leaves 2. *Whorled M.*

1. **Spiked Myriophyll.** *Myriophyllum spicatum*, Linn.
 (Fig. 349.)

(Eng. Bot. t. 83. *Water Milfoil.*)

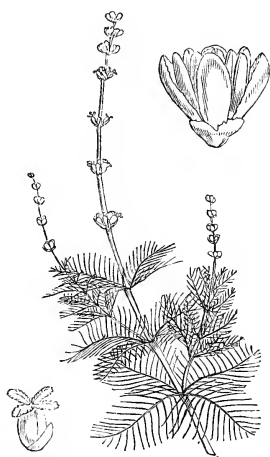


Fig. 349.

Rootstock perennial, creeping and rooting in the mud under water. Stems ascending to the surface, but usually wholly immersed, varying in length according to the depth of the water, and more or less branched. Leaves whorled, in fours or sometimes in threes or in fives, along the whole length of the stem; the numerous capillary segments entire, 3 to near 6 lines long. From the summit of the branches a slender spike, 2 to 3 inches long, protrudes from the water, bearing minute flowers arranged in little whorls, and surrounded by small bracts seldom as long as the flowers themselves. The upper flowers are usually males, their oblong anthers, on very short filaments, protruding from the minute calyx and petals. The lower ones are female,

very small, succeeded by small, nearly globular or slightly oblong capsules, each separating ultimately into 4 one-seeded carpels.

In watery ditches, and ponds, throughout Europe and Russian Asia. Extending all over Britain. *Fl. all summer.* A starved slender variety, with the whorls of the spike often reduced to a single flower, and

the lower ones having leaves at their base like the stem-leaves, has been considered by some as a distinct species, under the name of *M. alterniflorum* (Eng. Bot. Suppl. t. 2854).

2. Whorled Myriophyll. *Myriophyllum verticillatum*, Linn. (Fig. 350.)

(Eng. Bot. t. 218. *Water Milfoil*.)

In deep, clear waters the foliage is precisely that of the *spiked M.*, but the flowers are all immersed in the water, in the axils of the upper leaves. In shallow, muddy ditches, the segments of the leaves are often shorter and fewer, and the flowers form a spike protruding above the water as in the *spiked M.*, but the bracts or floral leaves are longer than the flowers, and pinnate like the stem-leaves: this form constitutes the *M. pectinatum* of some authors, but cannot be distinguished with any precision, even as a variety.

In watery ditches and ponds, with the *spiked M.*, over the greater part of its geographical range, and in many countries as common. In Britain it appears to be rather scarce, but perhaps frequently overlooked from its flowers not appearing above the water. *Fl. all summer*.

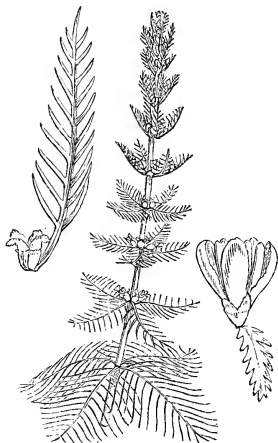


Fig. 350.

VI. MARESTAIL. HIPPURIS.

A single aquatic species, distinguished as a genus from *Myriophyllum* by its entire leaves, and by its flowers always without petals, with a scarcely perceptible border to the calyx, and reduced to 1 stamen, 1 subulate style, and 1 ovule and seed.

1. Common Marestail. *Hippuris vulgaris*, Linn. (Fig. 351.)

(Eng. Bot. t. 763.)

An aquatic plant with a perennial rootstock, and erect, annual, simple

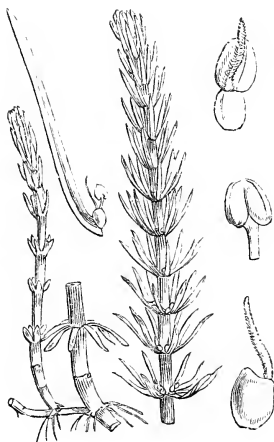


Fig. 351.

stems, the upper part projecting out of the water sometimes to the height of 8 or 10 inches, and crowded in their whole length by whorls of from 8 to 12 linear entire leaves; the submerged ones, when in deep streams, often two or three inches long, gradually diminishing till the upper ones are less than half an inch. Flowers minute, sessile in the axils of the upper leaves, consisting of a small globular or oblong ovary, crowned by a minute, scarcely perceptible border, on which is inserted a very small stamen, and from the centre of which proceeds a short, thread-like style. Fruit a little, oblong, 1-seeded nut, scarcely a line in length.

In shallow ponds, and watery ditches, over the greater part of Europe, Russian and central Asia, and North America, especially at high latitudes. In Britain, not near so frequent as the *Myriophyll* and *Ceratophyll*. *Fl. summer*. The whole plant has a general resemblance, although no affinity, to some of the more slender species of *Equisetum*, often called *Horsetails* or even *Marestails*.

XXVII. THE LYTHRUM FAMILY. LYTHRARIÆ.

Herbs, or, in some exotic genera, shrubs or trees, with leaves mostly (at least the lower ones) opposite, entire, and without stipules; the flowers either axillary or forming terminal racemes or spikes, more or less leafy at the base. Calyx free, tubular or campanulate, with as many, or twice as many, teeth as there are petals. Petals 4, 5, or sometimes more, rarely deficient, inserted at the top of the tube of the calyx, crumpled in the bud. Stamens equal to or double the number of the petals (or, in some exotic genera, indefinite), inserted in the tube of the calyx, often lower down than the petals. Style single. Ovary free from the calyx, but generally enclosed within its tube, divided into 2 or more cells, each with several ovules. Capsule of a thin texture, some-

times becoming 1-celled by the drying of the partition, containing several small seeds, without albumen.

A considerable family, some of the herbaceous semiaquatic species dispersed over almost every part of the globe, whilst the larger shrubby or arborescent ones spread over the tropics both in the new and the old world. They come near to some *Rosaceæ* in the insertion of the stamens, the position of the ovary, the structure of the seeds, etc., but independently of the structure of the ovary, they are readily known by their entire leaves, the lower ones at least always opposite. They are much more allied to the splendid and extensive tropical Order of *Melastomaceæ*, which however has no representative in Europe, and is even but little known in our stoves.

Calyx tubular. Petals longer than its teeth 1. *LYTHRUM*.
Calyx shortly campanulate. Petals minute or none 2. *PEPLIS*.

Several species of *Cuphea*, an American genus of this family, are now generally cultivated in our flower-gardens.

I. *LYTHRUM*. *LYTHRUM*.

Herbs, with sessile, axillary flowers, the upper ones forming long leafy spikes. Calyx tubular, with 8, 10, or 12 teeth, 4, 5, or 6 of them being external, and much narrower than the alternate inner ones. Petals 4, 5, or 6, longer than the calycine teeth. Stamens as many, or nearly twice as many, inserted below the petals on the tube of the calyx. Ovary and capsule 2-celled. Stigma borne on a distinct style.

The genus consists of very few species, spread over the northern hemisphere of the new as well as the old world.

Stems 2 feet or more. Leaves all opposite or whorled. Flowers
large, in a showy, terminal raceme 1. *Spiked L*.
Stems 6 or 8 inches or less. Upper leaves alternate, narrow.
Flowers small, with minute petals 2. *Hyssop L*.

1. *Spiked Lythrum*. *Lythrum Salicaria*, Linn. (Fig. 352.)

(Eng. Bot. t. 1061. *Purple Loosestrife*.)

Rootstock perennial, with short, annual, erect stems, 2 or 3 feet high, slightly branched, glabrous or softly downy. Leaves opposite or sometimes in threes, sessile, and clasping the stem at the base, lanceolate and entire, from 2 to 3 inches long. Flowers reddish-purple or pink, in rather dense whorls, forming handsome terminal

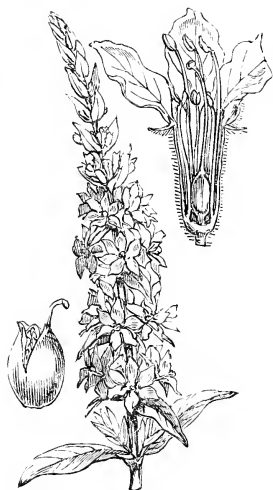


Fig. 352.

spikes, more or less leafy at the base; the upper floral leaves reduced to bracts scarcely longer, or even shorter than the flowers. Calyx about 3 lines long, with as many ribs as teeth; of these the outer ones are subulate, the inner ones short and broad. Petals oblong, often near half an inch long.

In wet ditches and marshy places, throughout Europe and Russian and central Asia, in Australia and North America. Abundant in England, Ireland, and southern and western Scotland, very local in the east and north. *Fl. summer.*

2. Hyssop Lythrum. *Lythrum hyssopifolium*, Linn. (Fig. 353.)

(Eng. Bot. t. 292.)



Fig. 353.

A glabrous annual, seldom more than 6 or 8 inches high, the stems slightly branched, and decumbent at the base, or, in starved specimens, erect and simple. Leaves sessile, narrow, and entire, barely half an inch long; the lower ones opposite, the upper ones alternate. Flowers small, solitary in the axils of the upper leaves; the calyx scarcely more than a line long, with minute teeth; the petals purple, about half that length.

In moist or muddy places, especially those which are occasionally inundated. Widely spread over central and southern Europe, all across central Asia, in North and South America, South Africa and Australia, but not so common in Europe as the *spiked L.* In Britain but few localities are recorded for it in some of the southern and eastern counties of England and in Ireland. *Fl. summer.*

II. **PEPLIS.** PEPLIS.

Small glabrous annuals, with opposite entire leaves, and minute axillary flowers. Calyx shortly campanulate, with 6 external and 6 internal smaller teeth. Petals very minute or none. Stamens 6. Style very short, scarcely distinct. Capsule globular.

A genus of very few species, widely spread over Europe, Asia, and Africa.

1. **Common Peplis.** *Peplis Portula*, Linn. (Fig. 354.)

(Eng. Bot. t. 1211. *Water Purslane*.)

A slightly branched annual, creeping and rooting at the base, seldom above 2 or 3 inches high, but sometimes many plants grow together in broad tufts or patches. Leaves obovate or oblong, seldom half an inch long, tapering into a stalk at the base. Flowers sessile in the axils of nearly all the leaves. Capsules enclosed in the somewhat enlarged calyx, but seldom attaining a line in diameter.

In wet ditches, and moist, watery places, in central and southern Europe to the Caucasus, extending northward into Scandinavia, but not recorded from Siberia or central Asia. Frequent in England and Ireland, less so in Scotland. *Fl. all summer.*



Fig. 354.

XXVIII. **THE GOURD FAMILY.** CUCURBITACEÆ.

Herbs, with long stems, prostrate, or climbing by means of axillary tendrils; alternate, palmately-veined leaves; and unisexual flowers, either solitary or in bunches or racemes in the axils of the leaves. Calyx 5-toothed. Petals united in a single 5-lobed corolla or rarely distinct, inserted in the margin of the calyx. Stamens in the male flowers inserted on the calyx or corolla; anthers curved, forming a wavy line on the short, thick filaments, which are sometimes free, but often so combined as that the number of stamens has been differently described as 5, or 3 only, or some-

times all the filaments form but one mass. Ovary in the females inferior, divided into 3 or 5 cells. Stigmas from 3 to 5, 2-cleft, either sessile or supported on a style. Fruit succulent or juicy, either indehiscent or bursting open elastically when ripe.

A considerable Order, chiefly tropical, and more especially African, with but very few species, extending into Europe or northern Asia. It is very easily recognized, as well by its foliage and tendrils as by the structure of the flowers. The only Order at all allied to it is that of the *Passion-flowers*, almost all of them American, and chiefly tropical, but of which some species are well known among our greenhouse or stove plants. To the *Gourd* family belong the *Cucumbers*, *Melons*, *Watermelons*, *Gourds*, *Pumpkins*, etc., of our gardens, most of them of very ancient cultivation, but unknown in a wild state.

I. **BRYONY.** BRYONIA.

Calyx with 5 small teeth. Corolla 5-lobed. Anthers apparently 3, of which 2 are double and 1 single. Style 3-lobed, with capitate or 2-lobed stigmas. Fruit a globular berry.

1. **Common Bryony.** *Bryonia dioica*, Linn. (Fig. 355.)

(Eng. Bot. t. 439.)



Fig. 355.

Rootstock perennial, thick and tuberous, sometimes branched; the annual stems climbing to a great length, and, as well as the whole plant, rough with minute hairs, containing an acrid juice, and emitting a sickening smell in drying. Tendrils simple or branched, and spirally twisted. Leaves more or less deeply divided into 5 or 7 broad, angular, and coarsely toothed lobes, of which the middle one is the longest. Flowers diœcious, the males several together in stalked racemes, of a pale yellow; the corolla broadly campanulate, about half an inch diameter; the females much smaller, generally 2 together, nearly

rotate, with a globular ovary. Berries red or orange, about 4 lines in diameter, containing several flat nearly orbicular seeds.

Common in hedges and thickets, in central and southern Europe to the Caucasus. Occurs in most English counties, and common in some,

but rare in the north and in Wales, and does not extend into Scotland or Ireland. *Fl. summer*. It must not be confounded with the so-called *black Bryony*, which is the common *Tamus*, a very different plant, with entire, shining leaves.

(The *Purslane* family, inserted here in the first edition, is now placed above, p. 135, next to the *Pink* family; and the *Paronychia* family will be found below, next to the *Goosefoot* family.)

XXIX. THE CRASSULA FAMILY. CRASSULACEÆ.

Herbs or shrubs, with succulent leaves, all or only the upper ones usually alternate, rarely all opposite, no stipules, and flowers in terminal racemes or cymes. Sepals 3 or more, usually 5, sometimes 15 to 20, cohering at the base. Petals as many, sometimes united in a single corolla. Stamens as many, or twice as many, inserted with the petals at the base of the calyx. Ovary superior; the carpels as many as the petals, and free, usually with a small, flat scale at their base, and forming as many distinct capsules, each containing several seeds attached to the inner angle. Embryo straight, with a thin, fleshy albumen.

A numerous family, extending over the greater part of the globe; but particularly abounding in south-western Africa and in the rocky districts of Europe and central Asia. The exact concordance in number of the parts of the flower of the different whorls forms the most prominent character of the family, to which the succulent leaves give a peculiar habit.

Stamens 3 or 4. Plants very small, with minute flowers . . . 1. TILLÆA.

Stamens twice as many as the petals (half of them sometimes without anthers).

Petals united in a tubular corolla, longer than the calyx . . . 2. COTYLEDON.

Petals free or nearly so, and spreading.

Flowers mostly with 5 or 6 petals and sepals 3. SEDUM.

All the flowers with more than 6, usually 10 or 12 petals

and sepals 4. HOUSELEEK.

Among the succulent plants in our greenhouses, the *Crassulas*, *Echeverias*, *Rocreas*, and a few others, belong to this family, but by

far the greater proportion form part of the *Mesembryanthemum* and *Cactus* families, which are entirely exotic.

I. **TILLÆA.** TILLÆA.

Very small annuals, with opposite leaves, and minute flowers in the upper axils. Sepals, petals, stamens, and carpels 3 or 4.

Besides the European species, the genus contains several from North America, central Asia, southern Africa, and Australia, most of them amongst the smallest of flowering plants.

1. Mossy Tillæa. *Tillæa muscosa*, Linn. (Fig. 356.)

(Eng. Bot. t. 116.)



Fig. 356.

The whole plant is seldom more than 2 inches high, and usually but an inch, or even much less, although much branched, and crowded with flowers; it is usually of a reddish colour, and slender, though succulent. Leaves narrow-lanceolate or linear. Flowers solitary in each axil, or several together in little clusters. Sepals lanceolate, pointed.

Petals minute and subulate. Carpels with 2 minute seeds in each.

On moist, barren, sandy heaths and wastes, in western and southern Europe, extending eastward round the Mediterranean, and northward to the Netherlands. Has been found in several of the southern counties of England, but not in Ireland or Scotland. *Fl. summer.*

II. **COTYLEDON.** COTYLEDON.

Herbs, or succulent shrubs, with scattered leaves (rarely opposite in some exotic species), and flowers in terminal racemes or panicles. Sepals 5, small. Petals combined into a single tubular or campanulate corolla, with 5 teeth or divisions. Stamens 10, inserted at the base of the corolla, but often adnate to the top of the tube. Carpels 5, each with a scale at the base.

Taking this genus in the sense in which it was understood by Linnaeus, it includes a considerable number of south-west African, besides several south European and central Asiatic ones, which, with our British species, are considered by some modern botanists as forming a distinct genus under the name of *Umbilicus*.

1. Wall Cotyledon. *Cotyledon umbilicus*, Linn. (Fig. 357.)(Eng. Bot. t. 179. *Pennywort*. *Navelwort*.)

Stock perennial, almost woody. Radical and lower leaves on long stalks, fleshy, orbicular, broadly crenate, and more or less peltate. Flowering stems erect, from 6 inches to a foot high, simple or slightly branched, leafy at the base only, and bearing a long raceme of pendulous, yellowish-green flowers. Calyx very small. Corolla cylindrical, about 3 lines long, becoming afterwards somewhat enlarged, with 5 short teeth, and enclosing the adnate stamens and the carpels.

On rocks, walls, and old buildings, in western Europe, extending eastward round the greater part of the Mediterranean, southwards to the Canary Islands, and northwards to Ireland, western England, and the south-west corner of Scotland. It occurs more sparingly along the south coast of England, and occasionally in some of the eastern counties. *Fl.* summer.

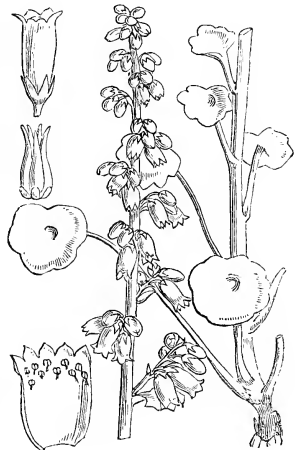


Fig. 357.

III. **SEDUM.** SEDUM.

Succulent herbs, sometimes woody at the base, with scattered leaves, occasionally opposite or whorled, especially at the base, or on barren stems; and yellow, white, reddish, or blue flowers, in terminal cymes or corymbs. Sepals 4 to 6 (usually 5). Petals as many, distinct. Stamens twice as many. Carpels as many as the petals, each with an entire or emarginate scale at the base, and containing several seeds.

A widely diffused genus, numerous in species, especially in central and southern Europe and central Asia, but extending also into North America, and the mountains of South America. A large number of the smaller, thick-leaved species are found on dry rocks or stony places, whence the popular name of *Stonecrop* applied to several of them.

Leaves flat, broad.

Flowers diœcious, with 4 sepals and petals 1. *Roseroot*

Flowers hermaphrodite, in large corymbs, with 5 sepals
and petals 2. *Orpine S.*

Leaves as thick, or nearly as thick, as broad.

Flowers white or reddish.

Leaves shortly ovoid or globular.

Whole plant quite glabrous 3. *English S.*

Calyx and pedicels with a few short, glandular hairs 4. *Thick-leaved S.*

Leaves oblong or cylindrical.

Glabrous perennial, with numerous short barren branches, and erect flowering stems 5. *White S.*

Viscidly downy, erect annual, without barren branches 6. *Hairy S.*

Flowers yellow.

Flowering stems 1 to 3 inches high. Cymes of two or three short branches.

Leaves ovoid or globular 7. *Biting S.*

Leaves cylindrical or oblong 8. *Tasteless S.*

Flowering stems at least 6 inches high. Cymes two or three times divided 9. *Rock S.*

The *S. Sieboldi*, from Japan, and some other exotic species, are to be met with in our gardens.

1. Roseroot Sedum. *Sedum Rhodiola*, DC. (Fig. 358.)

(*Rhodiola rosea*, Eng. Bot. t. 508. *Roseroot. Midsummer-men.*)



Fig. 358.

Stock short, thick, and almost woody; the annual stems erect, stout, simple, 6 inches to nearly a foot high, leafy to the top. Leaves alternate, sessile, obovate or oblong, slightly toothed, from 6 lines to an inch long, the lower ones often reduced to brown scales. Flowers dioecious, yellow or rarely purplish, forming rather dense cymes, surrounded by the upper leaves, which often assume a yellow or purple tinge; the males with 8 stamens, rather longer than the petals and sepals; the females with 4 carpels, ending in short, spreading styles.

In clefts of rocks, in northern and Arctic Europe and Asia, and in the higher mountain-ranges of central Europe and Asia. Abundant in Scotland and in the higher mountains of northern

England and Ireland, descending also to maritime cliffs in western Scotland. *Fl. summer.* The smell of the rootstock, when drying, has been compared to that of roses, whence its specific name.

2. Orpine Sedum. *Sedum Telephium*, Linn. (Fig. 359.)

(Eng. Bot. t. 1319. *S. purpureum*, Bab. Man. *Orpine*. *Livelong*.)

Rootstock perennial, the annual stems hard, erect, simple, about a foot high or rather more. Leaves scattered, obovate or oblong, and coarsely toothed; the lower ones 2 inches long or even more, and much narrowed or even stalked at the base; the upper ones often rounded at the base. Flowers numerous, purple in the British variety, forming a handsome corymb at the top of the stem. Sepals 5, short and pointed. Petals more than twice as long. Stamens 10, rather shorter than the petals.

On the borders of fields, hedgebanks, and bushy places, in northern and central Europe and Russian Asia, chiefly confined to hilly districts in the more southern portion of its area. Occurs in most of the British counties, but has been so long cultivated in cottage gardens, and is so tenacious of life, that it is difficult to say how far it is really indigenous. *Fl. summer, rather late.*



Fig. 359.

3. English Sedum. *Sedum anglicum*, Huds. (Fig. 360.)

(Eng. Bot. t. 171.)

A small perennial, seldom more than 3 inches high, and quite glabrous in all its parts; the stems decumbent and much branched at the base, with short, thick, almost globular leaves, crowded on the short barren branches, more loosely scattered and occasionally opposite on the flowering ones. Flowers white, occasionally tinged with pink, in a short, irregular cyme. Sepals short and green. Petals more than twice as long, lanceolate, and more or less pointed.

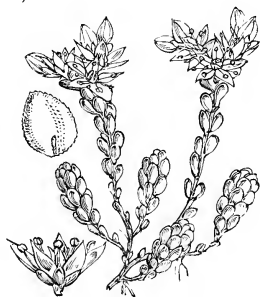


Fig. 360.

In rocky or stony places, usually not far from the sea, in western Europe, from Portugal to southern Norway, ascending also high into the mountains of the south-west. Abundant along the western coast

of Scotland, in Wales, and in Ireland, and appears also occasionally, but rarely, on the eastern coasts of England. *Fl. summer.*

4. Thick-leaved Sedum. *Sedum dasyphyllum*, Linn. (Fig. 361.)
(Eng. Bot. t. 656.)



Fig. 361.

Very nearly allied to the *English S.*, but usually rather smaller, of a glaucous-green, and the flowering summits more or less viscid, with short, glandular hairs; the leaves thicker, and more frequently opposite; the cymes of flowers more compact, of a dead white tinged with rose-colour; and the petals broader and not so pointed.

Much more widely spread on rocks and walls, in western, central, and southern Europe, than the *English S.*, but does not extend eastward to the Russian territory, nor northward into northern Germany. In Britain, only indicated in a few localities in southern England, with some doubt as to its being indigenous, but probably truly so in Cork county, Ireland. *Fl. summer.*

5. White Sedum. *Sedum album*, Linn. (Fig. 362.)
(Eng. Bot. t. 1578.)



Fig. 362.

Stock creeping and procumbent, bearing in winter short barren stems with crowded leaves, and in summer erect flowering branches, from 4 to 6 inches high, and perfectly glabrous. Leaves scattered, oblong or cylindrical, 3 to 6 lines long. Flowers of a pure white or slightly pink, rather small and numerous, in elegant terminal cymes or corymbs. Sepals short, oval, and obtuse. Petals near three times as long, oblong and obtuse.

On old walls, rocks, cottage-roofs, etc., over the greater part of Europe and Russian Asia, except the extreme north. In Britain, perhaps truly indigenous in the Malvern Hills, in Somersetshire, and in some parts of Ireland; in other places where it has been observed, it has probably been introduced from gardens. *Fl. summer.*

6. **Hairy Sedum.** *Sedum villosum*, Linn. (Fig. 363.)

(Eng. Bot. t. 394.)

An annual, with erect, nearly simple stems, 3 to 4 inches high; the upper part of the plant always more or less covered with short, viscid hairs, like the *thick-leaved S.* Leaves more than twice, often 4 or 5 times, as long as thick, alternate or scattered. Flowers few, of a pale, rather dingy rose-colour, in a small, rather loose, terminal cyme. Sepals ovate and green. Petals ovate, about twice as long as the calyx.

In bogs and along stony rills, in the mountains of western, central, and northern Europe, frequent in northern England and the Scotch Highlands, but not recorded from Ireland. *Fl. summer.*

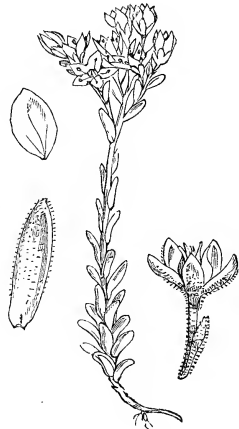


Fig. 363.

7. **Biting Sedum.** *Sedum acre*, Linn. (Fig. 364.)

(Eng. Bot. t. 839. *Wall-Pepper*.)

Tufts perennial and procumbent, consisting of numerous short barren stems, and erect or ascending flowering branches, from 1 to 2 or 3 inches high; the whole plant quite glabrous, assuming a yellowish tinge, and biting to the taste when chewed. Leaves small, thick, ovoid or sometimes nearly globular, those of the barren shoots usually closely imbricated in six rows. Flowers of a bright yellow, in small terminal cymes. Sepals very short. Petals much longer, narrow-oblong and pointed.



Fig. 364.

On walls and rocks, in stony and sandy places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Abundant in Britain. *Fl. summer.*

8. **Tasteless Sedum.** *Sedum sexangulare*, Linn. (Fig. 365.)

(Eng. Bot. t. 1946.)

Very near the *biting S.*, and by some considered as a mere variety,

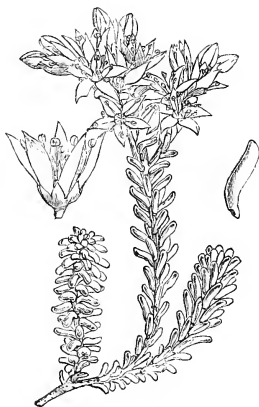


Fig. 365.

differing only by the more slender leaves, several times longer than thick, and by the flavour said to be less acrid.

A rather scarce plant, scattered over central and eastern Europe. Indicated in some parts of England, especially on old walls, in some of the eastern counties, but with doubts as to its being indigenous. *Fl. summer.*

9. Rock Sedum. *Sedum rupestre*, Linn. (Fig. 366.)

(Eng. Bot. t. 170, and *S. glaucum*, Eng. Bot. t. 2477.)



Fig. 366.

Stock perennial and creeping, with numerous short barren shoots, 1 to 3 inches long; the terminal flowering stems ascending or erect, 6 inches to a foot high. Leaves narrow, cylindrical, with a short point, and more or less extended at the base below their point of insertion into a short spur. Flowers yellow, considerably larger than in the other British species, forming a terminal cyme of 4 or 5 to 7 or 8 recurved branches, each bearing from 3 to 5 or 6 sessile flowers. Sepals short and ovate; the petals twice as long and linear.

On old walls and stony places, in temperate and southern Europe, extending northwards to southern Sweden. In Britain, it is undoubtedly wild in several of the southern and western counties of

England and in Ireland, but has besides established itself in many places where it has escaped from cultivation. *Fl. summer.* Slight varieties have been distinguished under the names of *S. reflexum* (Eng. Bot. t. 695) and *S. Fosterianum* (Eng. Bot. t. 1802), but the characters assigned, derived chiefly from the more or less crowded, closely

appressed or spreading leaves of the barren shoots, are very difficult to appreciate, and appear to depend more on station than on any real difference in the plants.

IV. **HOUSELEEK.** *SEMPERVIVUM.*

Succulent herbs, with a perennial, often woody stock, usually larger and coarser than the *Sedums*; the thick, succulent leaves densely imbricated on the short, often globular, barren shoots, and scattered along the erect flowering stems. Inflorescence and flowers as in *Sedum*, except that the parts of the flower are much more numerous, the sepals, petals, and carpels varying from 6 to 20 (usually 10 to 12). Stamens twice as many, but one half occasionally abortive and very small, or sometimes transformed into extra carpels. The little scales placed under the carpels are toothed or jagged, or sometimes wanting.

Besides the common one, there are a few allied species in central and southern Europe, some half-shrubby ones in the Canary Islands, and several in south-western Africa. Some of these have long been in cultivation among our garden succulent plants.

1. **Common Houseleek.** *Sempervivum tectorum*, Linn.

(Fig. 367.)

(Eng. Bot. t. 1320.)

The barren shoots form numerous, almost globular tufts, from whence, in subsequent years, arise the stout, succulent flowering stems to the height of about a foot. Leaves very thick and fleshy; the lower ones 1 to $1\frac{1}{2}$ inches long, ending in a short point, and bordered by a line of short, stiff hairs; the upper ones as well as the cymes more or less clothed with a short, viscid down. Flowers pink, sessile along the spreading or recurved branches of the cyme. Petals linear, pointed, two or three times as long as the sepals, downy on the outside, and ciliate on the edges, like the leaves.

In rocky situations, in the great mountain-ranges of central and southern Eu-



Fig. 367.

rope to the Caucasus, and having been very long cultivated as a curiosity, it is widely spread over northern Europe, as an introduced plant, on cottage-roofs and old walls. It is only under such circumstances that it is to be met with in Britain. *Fl. summer.*

XXX. THE RIBES FAMILY. RIBESIACEÆ.

This family is identical with the Linnæan genus *Ribes*, and nearly allied to the exotic shrubby genera of the *Saxifrage* family, but maintained as distinct on account of the succulent fruit with parietal placentas, and the union of the styles at the base, indicating some approach to the *Cactus* family.

I. RIBES. RIBES.

Shrubs, with alternate, palmately veined or lobed leaves, no stipules, and axillary flowers in racemes, or rarely solitary. Calyx adherent to the ovary at the base, the limb divided into 4 or 5 segments. Petals as many, very small and scale-like, inserted at the base of the segments of the calyx. Stamens as many. Ovary inferior, 1-celled, with many ovules inserted on 2 parietal placentas. Style deeply divided into 2 or 4 lobes. Fruit a berry, filled with juicy pulp, in which the seeds are suspended by long stalks. Albumen horny, with a small, straight embryo.

A genus spread over the whole of the temperate regions of the northern hemisphere. The species are most numerous in north-western America, and a small number extend down the Andes to the southern extremity of that continent.

Stems prickly. Peduncles 1 or 2-flowered 1. *Gooseberry R.*
Stems unarmed. Flowers in racemes.

Flowers all complete.

Leaves inodorous. Pedicels all short. Fruit red or

white 2. *Currant R.*

Leaves strongly scented. Lowest pedicels of each ra-

ceme longer than the upper ones. Fruit black . . . 4. *Black R.*

Flowers dioecious. Fruit red 3. *Mountain R.*

The *scarlet Ribes* and several others, now frequent in our shrubberies, are natives of north-western America.

1. *Gooseberry Ribes*. *Ribes Grossularia*, Linn. (Fig. 368.)

(Eng. Bot. t. 1292, and *R. Uva-crispa*, Eng. Bot. t. 2057.)

A much branched but rather weak shrub, 3 or 4 feet high, with numerous palmately spreading prickles, either single or two or three

together. Leaves small, orbicular, palmately divided into 3 or 5 crenated lobes, more or less hairy on both sides. Flowers green, hanging singly or in pairs on short pedicels from little tufts of young leaves. Calyx-tube shortly campanulate, the segments oblong, about twice the length of the petals. Berry of the wild plant rather small and yellowish, sprinkled with stiff hairs, but in cultivation varying much in size and colour, and often quite glabrous.

In thickets, open woods, and hedges, in the rocky parts of central and southern Europe, and western Asia. In Britain, well established in many places, in hedges and even wilder places, but scarcely indigenous, having been abundantly cultivated in cottage-gardens for several centuries. *Fl. early spring.*



Fig. 368.

2. Currant Ribes. *Ribes rubrum*, Linn. (Fig. 369.)

(Eng. Bot. t. 1289, and *R. petraeum*, t. 705. *Red and White Currants.*)

An erect, branching shrub, 3 or 4 feet high, without prickles. Leaves on rather long stalks, much larger and thinner than those of the *Gooseberry R.*, with 3 or 5 rather short and broad-toothed lobes, glabrous, or more frequently sprinkled with a few minute hairs on the upper surface, and more or less downy underneath. Flowers small, greenish-white, several together in axillary racemes at the base of the year's shoots. These racemes are either erect or pendulous when in flower, but almost always pendulous when in fruit; the pedicels all short, and do not commence at the very base of the raceme as in the *black R.*, each pedicel being in the axil of a small bract. Calyx-segments broadly spreading, obovate or rounded, twice the length of the small petals. Berries red when wild, varying in cultivation from red to white.



Fig. 369.

In rocky woods, in northern and central Europe and Russian Asia, extending to the Arctic Circle, but replaced in southern Europe and central Asia by the *R. petraeum*. Frequent in Scotland, the north of England, and occurs also in some parts of southern England and Ireland, but it has been so long and so generally cultivated, that it is difficult to say how far it is really indigenous. *Fl. spring*. A variety with more upright racemes has been falsely referred to the Continental *R. petraeum*, and another with the flowers almost sessile has been distinguished as *R. spicatum* (Eng. Bot. t. 1290).

3. Mountain Ribes. *Ribes alpinum*, Linn. (Fig. 370.)

(Eng. Bot. t. 704.)



Fig. 370.

Very near the *Currant R.*, but the leaves are smaller, more deeply divided, smooth and shining, and glabrous underneath; the flowers much smaller and always diœcious; the males rather numerous, in little, erect racemes, of 1 to 1½ inches; the pedicels slender, but not quite so long as the bracts; the females, on separate shrubs, much fewer together, in very short racemes, and often almost sessile; the berries small and tasteless.

In rocky, hilly districts, in central and southern Europe and Russian Asia; not an alpine plant, notwithstanding its name, but said to extend to rather high northern latitudes; it may not, however, always have been properly distinguished from the *Currant R.* Rather scarce in Britain, and chiefly in central and northern England and southern Scotland; it does not extend into the Highlands, nor is it recorded from Ireland. *Fl. spring*.

4. Black Ribes. *Ribes nigrum*, Linn. (Fig. 371.)

(Eng. Bot. t. 1291. *Black Currant*.)

Easily known by the peculiar smell of the leaves when rubbed, arising from the small, glandular dots copiously sprinkled on the under side. Stem unarmed. Leaves rather larger than in the *Currant R.*, more cordate, and usually with only three broad, crenate lobes, coarse and rough, but scarcely hairy. Racemes pendulous, looser than in the

Currant R.; the flowers larger, campanulate, on longer pedicels, of which the lowest, arising from the very base of the raceme, are much longer than the others. Calyx rather hoary outside. Berries black.

In woods, in northern, central, and eastern Europe, and Russian and central Asia, but less common in western Europe than the last two species. In Britain, although found in cool, shady places, and boggy thickets, in various parts of England, yet it is very doubtful whether it be truly indigenous, as, like the *Gooseberry* and the *Currant*, its cultivation dates from a very early period. *Fl. spring.*



Fig. 371.

XXXI. SAXIFRAGE FAMILY. SAXIFRAGACEÆ.

Herbs, or in exotic genera, trees or shrubs, with alternate or opposite leaves, and no stipules. Calyx free, or more or less adherent to the ovary, with 4 or 5 (rarely more) lobes or segments. Petals as many, perigynous, or none. Stamens as many, or twice as many (rarely more), perigynous. Ovary either adherent or inserted on a broad base, either 2- or 4-celled, or 1-celled, with 2 or more parietal placentas, often lobed at the top, with as many (rarely twice as many) styles or stigmas as cells or placentas. Fruit a capsule. Seeds several, usually many, to each cell or placenta; the albumen usually copious, rarely none.

An extensive family, ranging over nearly the whole world, and including many shrubs and trees, such as the *Hydrangeas*, *Escallonias*, *Philadelphuses* (*Syringas*), *Deutzias*, etc., of our gardens, of which the British herbaceous genera can give very little idea. The characters of the Order are moreover somewhat complicated, there being several exceptions among exotic genera, besides those alluded to in the above general character, and the limits to be assigned to it are by no means satisfactorily settled. The four British genera differ from each other

in many essential points, but are all distinguished from the *Rose* family by the definite stamens and want of stipules, from that and the *Crassula* family by the carpels united into a single ovary, and from the *Lythrum* family by the distinct styles and the more adherent ovary.

Petals none 2. *CHRYOSPLENE*.
 Petals 5.

Stamens 10, all bearing anthers. Styles 2 1. *SAXIFRAGE*.

Stamens 5, bearing anthers; 5 barren, with a tuft of
 globular-headed filaments. Stigmas 4 3. *PARNASSIA*.

Stamens 5 only. Styles 6 or 8 (3 or 4, each deeply 2-
 cleft) 4. *SUNDEW*.

I. **SAXIFRAGE.** *SAXIFRAGA*.

Herbs, either annual or more commonly with a perennial tufted stock, with radical or alternate or rarely opposite leaves, no stipules, and terminal flowers either solitary or in cymes or panicles. Calyx free, or more or less adherent to the ovary at the base, with 5 teeth or segments. Petals 5. Stamens 10, inserted with the petals at the base of the segments of the calyx. Ovary 2-celled, superior or more or less inferior, with 2 distinct styles. Seeds several in each cell, with a small embryo in a fleshy albumen.

A numerous genus, consisting chiefly of mountain or rock plants, abundant in all the great mountain-chains of the northern hemisphere, some species ascending to the highest alpine or furthestmost Arctic stations, others extend along the great chain of the Andes to the Antarctic Circle, whilst a few descend to the hot limestone rocks of the Mediterranean region.

Leaves all opposite and small. Low, spreading plant.

Flowers purple 1. *Purple S.*

Leaves alternate or radical.

Flowers yellow.

Calyx spreading, adherent at the base. Stem bearing several flowers 2. *Yellow S.*

Calyx reflexed, free. Stems 1-flowered 3. *Marsh S.*

Flowers white or pink.

Calyx adherent at the base, the lobes erect or spreading.

Stem much branched at the base, with procumbent or densely tufted barren shoots. Leaves narrow, simple or 3-lobed.

Leaves or their lobes acute. Tufts loose 4. *Cut-leaved S.*

Leaves or their lobes obtuse. Tufts dense 5. *Tufted S.*

Stems simple or branched, without barren shoots at the base.

Perennials, with the radical leaves larger, and longer stalked.

Lower leaves rounded or palmate. Flowers solitary or paniced.

Lowland plant. Stem erect. Lower leaves crenate 6. *Meadow S.*

High alpine plants. Stems weak. Lower leaves angular or deeply lobed.

Petals at least twice as long as the calyx . . . 7. *Drooping S.*

Petals scarcely exceeding the calyx . . . 8. *Brook S.*

Radical leaves ovate, toothed. Stem almost leafless, with a terminal head of small flowers 10. *Alpine S.*

Annual, with narrow leaves, entire or three-lobed . . . 9. *Rue-leaved S.*

Calyx free, with reflexed divisions.

Flowers white. Leaves thin, angular or acutely toothed 11. *Star S.*

Flowers pink. Leaves thick and leathery, crenate.

Leaves obovate, narrowed at the base . . . 12. *London-pride S.*

Leaves orbicular, cordate or rounded at the base 13. *Kidney S.*

The large, somewhat coarse Siberian *thick-leaved Saxifrage* (*S. crassifolia*) is common among herbaceous plants in our gardens. The Chinese *S. sarmentosa*, with long, hanging runners, is often grown in pots in cottage windows ; and several species from the great European mountain-ranges, form a great proportion of all cultivated collections of alpine plants.

1. Purple Saxifrage. *Saxifraga oppositifolia*, Linn.

(Fig. 372.)

(Eng. Bot. t. 9.)

Stems perennial, creeping, very much branched, forming low, straggling tufts, of several inches in diameter, seldom rising above an inch from the ground. Leaves crowded, small, opposite, obovate, and ciliate. Flowers rather large, handsome, and purple, often so crowded as almost to conceal the foliage, although growing singly on very short erect branches. Calyx-tube adhering to the ovary and capsule up to more than half its length ; the segments ovate, green, erect or spreading, not half so long as the petals.



Fig. 372.

In moist alpine situations, in the higher mountain-ranges of Europe, and Russian and central Asia, extending far into the Arctic regions. Common in the Scotch Highlands, and also found, but sparingly, on some of the higher Irish, Welsh, and northern English mountains. *Fl. spring and early summer.*

2. Yellow Saxifrage. *Saxifraga aizoides*, Linn. (Fig. 373.)

(Eng. Bot. t. 39.)



Fig. 373.

Stock short, sometimes tufted, the flowering stems ascending to about 6 inches high. Leaves alternate, narrow, rather thick, smooth and shining, about half an inch long, entire or rarely notched with 1 or 2 teeth. Flowers yellow, in a loose panicle of from 3 or 4 to a dozen or more. Calyx-segments not much shorter than the petals, and often narrow, like them and almost as yellow, giving the flower the appearance of having ten petals with a broad circular disk in the centre. Capsule adhering, to about half its length, to the short tube of the calyx.

On wet rocks or gravel, along rills and springs, in almost all mountainous districts of Europe, Russian Asia, and northern America, to the Arctic Circle, descending also much lower than the last. Abundant in Scotland, the north of England, and some parts of Ireland, but apparently wanting in Wales. *Fl. summer and autumn.*

3. Marsh Saxifrage. *Saxifraga Hirculus*, Linn. (Fig. 374.)

(Eng. Bot. t. 1009.)

Perennial stock still shorter than in the last, and often reduced to a small tuft. Leaves alternate, narrow-oblong or linear, and entire. Flowering stems ascending, as in the *yellow S.*, to about 6 inches, but terminated by a single, rather large flower; the calyx almost entirely free, with oblong, reflexed divisions, not half so long as the erect, narrow-obovate or oblong, yellow petals. Capsule rather large, ending in 2 spreading beaks.

In wet moors, at high elevations, chiefly in the mountain-ranges of eastern Europe and central and Russian Asia, and generally round the Arctic Circle; rare in western Europe. In Britain, only in a few localities in northern England, southern Scotland, and Ireland. *Fl.* August.



Fig. 374.

4. Cut-leaved Saxifrage. *Saxifraga hypnoides*, Linn.
(Fig. 375.)

(Eng. Bot. t. 454, *S. platypetala*, t. 2276, *S. elongella*, t. 2277, *S. hirta*, t. 2291, and *S. affinis*, Suppl. t. 2903.)

Perennial stock usually shortly creeping and rather slender, much branched, with numerous decumbent barren shoots, attaining, in moist situations, 2 or 3 inches, but sometimes contracted into a short, dense tuft. Leaves mostly entire, 2 or 3 lines long, narrow-linear and pointed, but some of the larger ones are often 3-lobed, or even 5-lobed, and attain half an inch; they are glabrous, or more or less ciliated with slender, often glandular, hairs. At the ends of the shoots, and in the axils of the leaves, the leaf-tufts are often somewhat enlarged and crowded into an oblong head or bulb. Flowering stems 3 to 6 inches high, with very few leaves, and from 1 to 6 or 8 rather large, white flowers. Calyx adherent to about two-thirds the length of the capsule; the segments not one-third so long as the petals, and usually more or less pointed.



Fig. 375.

In rather moist, rocky situations, in the mountains of western Europe, descending occasionally to low, hilly districts. Abundant in Scotland, Ireland, Wales, and northern England, but very local in the southern counties. *Fl. summer*. It is very variable in the degree of development of its stems, leaves, and flowers, in the more or less viscid hairs, and in the leaves and calyx-segments more or less pointed or almost obtuse. This has given rise to its subdivision into numerous supposed species; besides that some of its extreme varieties have been mistaken for *S. geranioides*, *S. muscoides*, and other Continental species not found in Britain.

5. Tufted Saxifrage. *Saxifraga cæspitosa*, Linn. (Fig. 376.)

(Eng. Bot. t. 794, and *S. palmata*, Eng. Bot. t. 455.)

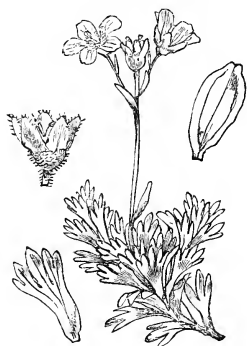


Fig. 376.

Very near to the last, but never emitting the weak, procumbent barren shoots of that species; the leaves broader, more obtuse, and more frequently lobed, and the calyx-divisions also obtuse. The short, leafy stems are crowded into dense tufts; the flowering stems from 2 to 3 inches high, generally covered with a short, glandular down, and bearing 1 or 2 white flowers, smaller than in the *cut-leaved S.*

A high northern and Arctic plant. In Britain, only on some of the higher Scotch mountains, such as Ben Avers and Ben Nevis. *Fl. summer*. High alpine forms of the *cut-leaved S.* have been frequently mistaken for this plant, and are not indeed always easy to distinguish from it. The Irish variety figured (Eng. Bot. Suppl. t. 2909) seems referable rather to the *cut-leaved* than to the *tufted S.*

6. Meadow Saxifrage. *Saxifraga granulata*, Linn. (Fig. 377.)

(Eng. Bot. t. 500.)

Perennial stock reduced to a cluster of small bulbs, covered with whitish or brown hairy scales. Stems erect, 6 inches to a foot high, simple or slightly branched, more or less covered with short spreading hairs, which become glandular in the upper part of the plant. Radical and lower leaves on long stalks, reniform, obtusely crenate or lobed, the upper ones few and small, more acutely lobed or entire. Flowers

white, rather large, 3 to 6 together, in rather close terminal cymes. Calyx adherent to about the middle of the ovary, with rather obtuse divisions, about half the length of the petals.

In meadows, pastures, and on banks, throughout temperate Europe, extending northward into Scandinavia, and eastward into central, but perhaps not into Russian Asia. Abundant in several parts of England, Ireland, and southern Scotland, but scarcely penetrates into the Highlands. *Fl. spring and early summer.*



Fig. 377.

7. Drooping Saxifrage. *Saxifraga cernua*, Linn. (Fig. 378.)

(Eng. Bot. t. 664.)

In many respects allied to the *meadow S.*, of which it may be a starved alpine variety. It is weaker, more glabrous, and slender; the stock does not always form distinct bulbs; the leaves are smaller, angular or broadly lobed, and the upper ones have often little bulbs in their axils. Flowering stems more or less drooping at the summit, with 1 to 3 flowers, rather smaller than in the *meadow S.*

At great elevations, in a few of the larger mountain-ranges of Europe and Asia, and all round the Arctic Circle. In Britain, only known on the summit of Ben Lawers, where, however, it very seldom flowers, and is now almost extinct.



Fig. 378.

8. Brook Saxifrage. *Saxifraga rivularis*, Linn. (Fig. 379.)

(Eng. Bot. t. 2275.)

A glabrous plant, still smaller than the *drooping S.*, which it much resembles in foliage. Perennial stock small, and seldom forming bulbs;



Fig. 379.

radical leaves on long stalks, deeply 3- or 5-lobed. Flowering stems weak, only 2 or 3 inches long, with very few small leaves, and 1 to 3 flowers, like those of the *drooping S.*, but much smaller, the petals scarcely exceeding the calyx.

A high alpine or Arctic species, with nearly the same geographical range as the *drooping S.*, but usually not so scarce. In Britain, it occurs sparingly near the summit of Ben Lawers and Ben Nevis, and more abundantly on Loch-nagar. *Fl. August.*

9. Rue-leaved Saxifrage. *Saxifraga tridactylites*, Linn.
(Fig. 380.)

(Eng. Bot. t. 501.)



Fig. 380.

A little erect annual, 2 to 5 inches high, simple or branched, and more or less clothed with a glandular down. Radical leaves very small, entire, and stalked. Stem-leaves either entire and linear-oblong or more frequently 3-lobed. Flowers small, white, growing singly on rather long pedicels. Calyx adherent, with ovate segments not half so long as the petals.

On walls and rocks, throughout Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Frequent in England, Ireland, and southern Scotland, less so further north, especially on the western side. *Fl. spring and early summer.*

10. Alpine Saxifrage. *Saxifraga nivalis*, Linn. (Fig. 381.)

(Eng. Bot. t. 440.)

Perennial stock short and simple, but thick and hard, crowned with a tuft of spreading, obovate, toothed leaves, rather thick and leathery,

and narrowed into a stalk at the base. Stems simple, erect, 2 to 5 inches high, slightly hairy in the upper part, leafless or with 1 or 2 small leaves close under the flowers. These are small, collected together in little terminal heads. Calyx adherent to about halfway up the ovary, with shortly oblong spreading segments, about the length of the obovate, white petals.

In the mountains of northern and Arctic Europe and Asia, and on the highest of the Sudetan mountains in Bohemia. Not uncommon in the Scotch mountains, and found also, but much more sparingly, in the Lake districts of northern England, in North Wales, and on Benbulbin in Ireland. *Fl. summer.*

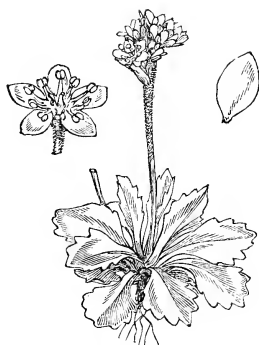


Fig. 381.

11. Star Saxifrage. *Saxifraga stellaris*, Linn. (Fig. 382.)

(Eng. Bot. t. 167.)

A perennial, but the stock is small, and has often an annual appearance; it is crowned by one or more tufts of spreading leaves, rather thin, varying from oblong to obovate, with a few coarse teeth, and tapering at the base. When luxuriant, these tufts are elongated into leafy branches of 1 or 2 inches. Stems erect, 3 to 6 inches, leafless, except a small, leafy bract under each pedicel. Flowers from 2 or 3 to 8 or 10, rather small, white and starlike, on slender, spreading pedicels, forming a loose terminal panicle. Calyx free almost to the base, the segments closely reflexed on the pedicel. Petals narrow and spreading. Capsule rather large, with 2 diverging beaks.



Fig. 382.

On wet rocks and along rivulets and springs, in all the mountain-ranges of Europe and Russian Asia, from the Mediterranean to the Arctic regions, and also in northern America. Frequent in the Scotch Highlands, and found also in the mountains of northern England, North Wales, and Ireland.

12. **London-pride Saxifrage.** *Saxifraga umbrosa*, Linn.
(Fig. 383.)

(Eng. Bot. t. 663, and Suppl. 2891. *London Pride. St. Patrick's Cabbage. None-so-pretty.*)

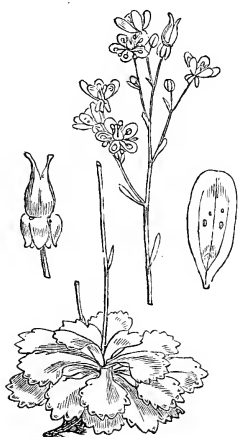


Fig. 383.

Perennial stock shortly branched, crowned by the spreading leaves, forming dense tufts, which in our gardens will attain near a foot in diameter. Leaves rather thick and leathery, usually glabrous, obovate, an inch or more in length, bordered with cartilaginous crenatures or coarse teeth, and narrowed at the base into a short, more or less flattened stalk, ciliate at the edges. Stems erect, leafless, 6 inches to a foot high. Flowers small, pink, elegantly spotted with a darker colour, in a loose, slender panicle. Calyx free, with short segments closely reflected on the pedicel. Petals much longer, ovate or oblong, and spreading.

In shady places, in Portugal, western Spain, and the higher Pyrenees, and re-appearing in south-western Ireland.

Cultivated from an early period in our gardens, it appears to have established itself in some localities in northern England and south-western Scotland. *Fl. early summer.*

13. **Kidney Saxifrage.** *Saxifraga Geum*, Linn. (Fig. 384.)

(Eng. Bot. t. 1561, and Suppl. t. 2893.)

Closely allied to the *London-pride S.* in its habit and flowers, this species only differs in its leaves, which are orbicular, usually notched or cordate at the base, with long stalks, less flattened than in the last species, and usually very hairy; the leaves themselves also have often a few scattered hairs on both surfaces.

The geographical range is the same as that of the *London-pride S.*, but it appears generally to prefer lower altitudes. *Fl. early summer.* Specimens in some measure intermediate between this and the last species, with the leaves orbicular or nearly so, but not cordate, and the

stalk somewhat flattened, have been gathered near Killarney. They have been published as species, under the names of *S. hirsuta* (Eng. Bot. t. 2322) and *S. elegans* (Eng. Bot. Suppl. t. 2892), whilst others consider them as hybrids. In favour of the latter supposition there appears to be but little evidence, and they are probably mere varieties of the *Kidney S.*

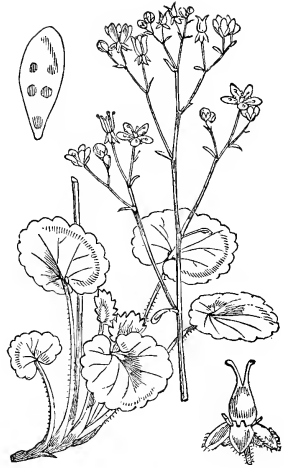


Fig. 384.

II. **CHRYSOSPLENE.** CHRYSOSPLENIUM.

Delicate herbs, perennial and creeping at the base; the short flowering stems ascending, and often of a golden yellow at the top; with orbicular leaves, no stipules, and small yellow flowers, in short, leafy terminal cymes. Calyx adherent, with 4, or rarely 5, short, free segments. Petals none. Stamens 8, rarely 10, inserted at the base of the calyx-segments. Ovary adherent to near the top, where it is divided into 2 short, conical lobes, each with a short style, and surrounded by a crenated disk within the stamens. Capsule 1-celled, opening at the top in 2 short valves. Seeds several, attached to 2 parietal placentas. Albumen copious, with a small embryo.

A small genus, spread over the temperate and colder regions of both the northern and southern hemispheres.

Leaves opposite 1. *Opposite C.*
 Leaves alternate 2. *Alternate C.*

1. **Opposite Chrysosplene.** *Chrysosplenium oppositifolium*, Linn. (Fig. 385.)

(Eng. Bot. t. 490. *Golden Saxifrage*.)

The loose, leafy tufts often spread to a considerable extent; the stems scarcely rising above 4 or 5 inches from the ground, simple or



Fig. 385.

forked near the top. Leaves all opposite, 3 or 4 to 6 or 8 lines in diameter, slightly crenated or sinuate, and notched at the base, with a few stiff hairs on the upper surface. Flowers small and sessile, in little, compact cymes, surrounded by leaves like those of the stem, but smaller, more sessile, and of a golden yellow. Calyx-segments obtuse and spreading.

In moist, shady places, along the sides of rivulets, dispersed over the greater part of Europe and Russian Asia. Abundant in Britain. *Fl. spring.*

2. Alternate Chrysosplene. *Chrysosplenium alternifolium*, Linn. (Fig. 386.)

(Eng. Bot. t. 54.)

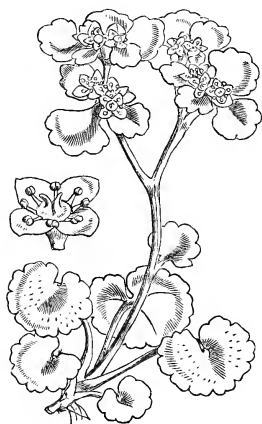


Fig. 386.

Closely resembles the *opposite C.*, but is usually of a paler colour; the leaves are always alternate, and the lower ones on longer stalks, and rather more of a kidney-shape.

In similar situations as the *opposite C.*, and much more common in Continental Europe, Russian and central Asia, and northern America, extending into the Arctic regions. In Britain, on the contrary, much less common than the *opposite C.*, although pretty generally distributed. *Fl. spring.* The two species are frequently found growing together, but appear always to retain their characters.

III. PARNASSIA. PARNASSIA.

Herbs, with a perennial stock; entire leaves, mostly radical; and erect, annual flowering stems, usually bearing a single leaf, and a single

terminal flower. Calyx in the British species almost free, with 5 segments. Petals 5, perigynous. Stamens perigynous, 5 perfect, and 5 imperfect, bearing, instead of anthers, a tuft of globular-headed filaments. Stigmas 4, rarely 3, sessile. Capsule 1-celled, opening in 4, or rarely 3, valves. Seeds very numerous, without albumen, inserted on 4, rarely 3, parietal placentas, opposite the styles, and in the centre of the valves.

A few species are inhabitants of bogs and wet places in Europe, Asia, and North America. The above characters are so well marked, that the genus is not easily confounded with any other, but its place in the Natural System has been much disputed. It has been most generally placed amongst *Thalamiflores*, with the *Sundews*, next to the *Violet* and *Milkwort* families; but its close affinity with *Saxifrage* and *Chrysosplene* has now been fully proved, especially by the recent publication of several curious Himalayan species.

1. **Marsh Parnassia.** *Parnassia palustris*, Linn. (Fig. 387.)

(Eng. Bot. t. 82. *Grass-of-Parnassus*.)

Stock very short. Radical leaves rather long-stalked, broadly heart-shaped, glabrous as the rest of the plant. Stems 6 inches to a foot high, with a single sessile leaf below the middle. Flower white, rather large. Segments of the calyx ovate, spreading, 3 to 3½ lines long. Petals obovate, spreading, nearly twice that length. Imperfect stamens at the base of each petal, short and thick, with a tuft of 10 to 12 short, white filaments, each bearing a little, yellow, globular gland. Capsule globular.

In bogs and moist heaths, throughout northern Europe and Russian Asia, becoming a mountain plant in southern Europe and west-central Asia. Frequent in Britain. *Fl. end of summer and autumn.*



Fig. 387.

IV. **SUNDEW.** DROSERA.

Herbs, with long-stalked, radical leaves, covered with long, glandular hairs or bristles; the leafless flower-stems terminating in a simple or forked unilateral spike or raceme. Sepals 5, free from the ovary.

Petals and stamens 5; in the British species almost hypogynous, but in many exotic ones decidedly perigynous. Styles 3 or 4, each divided into 2. Capsule 1-celled, opening into 3 or 4 valves, sometimes split into twice that number. Seeds several, with albumen, inserted on 3 or 4 parietal placentas in the centre of the valves.

The *Sundews* are rather numerous in species, and found in nearly all parts of the globe where there are bogs. The curious glandular hairs of the leaves distinguish them from all other British genera, independently of their floral characters. Associated with a few exotic genera, all remarkable for the same glandular hairs, but differing chiefly in number of stamens, or of the valves of the capsule, or in the insertion of the ovules, they form a distinct group, usually considered as an independent family among *Thalamiflores*; but a considerable number of species have their flowers rather perigynous than hypogynous, and they appear much more naturally associated with *Saxifrages* as a somewhat anomalous tribe of that family.

Leaves obovate or orbicular, as broad as long 1. *Common S.*
 Leaves obovate-oblong, three or four times as long as broad . . 2. *Oblong S.*
 Leaves linear-spathulate, five or more times as long as broad . . 3. *English S.*

1. Common Sundew. *Drosera rotundifolia*, Linn. (Fig. 388.)

(Eng. Bot. n. 867 in the text, 868 on the plate.)

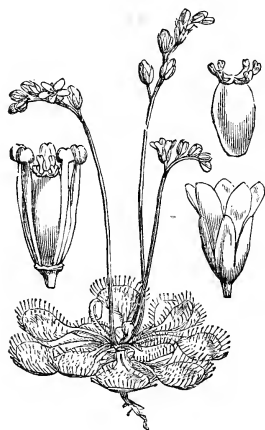


Fig. 388.

Rootstock short and slender, the leaves on long stalks, nearly orbicular, 3 to near 6 lines in diameter, covered on the upper surface with long, red, viscid hairs, each bearing a small gland at the top. Flower-stems slender, erect, and glabrous, 2 or 3 to 5 or 6 inches high, the upper portion, consisting of a simple or once-forked unilateral raceme, rolled back when young, but straightening as the flowers expand. Pedicels nearly a line long, without bracts. Calyx near 2 lines. Petals white, rather longer, expanding in sunshine. Seeds spindle-shaped, pointed at both ends, the loose testa several times longer than the small, ovoid albumen.

In bogs, and wet, heathy ground, throughout central and northern Europe, and Russian Asia; from northern Spain to the Arctic regions. Abundant in all parts of Britain where there are considerable bogs. *Fl. summer and early autumn.*

2. Oblong Sundew. *Drosera longifolia*, Linn. (Fig. 389.)

(Eng. Bot. n. 868 in the text, 867 on the plate.)

Distinguished from the *common S.* by the leaves much more erect, not half so broad as long and gradually tapering into the footstalk; the flowering stem is also usually shorter, and not so slender; the styles less deeply divided, and the seeds are ovoid or oblong; the testa either close to the albumen, and taking its form, or very slightly prolonged at each end.

In bogs, with the *common S.*, but much less generally distributed both on the continent of Europe and in Britain. *Fl. summer and early autumn.*



Fig. 389.

3. English Sundew. *Drosera anglica*, Huds. (Fig. 390.)

(Eng. Bot. t. 869.)

Very like the *oblong S.*, but the leaves are still longer and narrower, often an inch long without the stalk, the flowers and capsule larger, and the testa of the seed is loose and elongated, as in the *common S.*, but more obtuse at the ends.

In bogs, apparently spread over the same geographical range as the two other species, but being often confounded with the *oblong S.*, of which it may be a mere variety, its precise stations are not very clearly defined. In Britain, more frequent in Scotland and Ireland than in England. *Fl. summer and early autumn.*



Fig. 390.

XXXII. UMBELLATE FAMILY. UMBELLIFERÆ.

Herbs, or, in a few exotic species, shrubs, with alternate leaves, often much cut or divided; the footstalk usually dilated at the base, but no real stipules. Flowers usually small, in terminal or lateral umbels, which are either compound, each ray of the general umbel bearing a partial umbel, or more rarely simple or reduced to a globular head. At the base of the umbel are often one or more bracts, constituting the *involucre*, those at the base of the partial umbel being termed the *involucel*. Calyx combined with the ovary, either entirely so or appearing only in the form of 5 small teeth round its summit. Petals 5, inserted round a little fleshy disk which crowns the ovary, usually turned in at the point, and often appearing notched. Stamens 5, alternating with the petals. Ovary 2-celled, with one ovule in each cell. Styles 2, arising from the centre of the disk. Fruit, when ripe, separating into 2 one-seeded, indehiscent carpels, usually leaving a filiform central axis, either entire or splitting into two. This axis, often called the *carpophore*, is however sometimes scarcely separable from the carpels. Each carpel (often called a *mericarp*, and having the appearance of a seed) is marked outside with 10, 5, or fewer, prominent nerves or *ribs*, occasionally expanded into *wings*, and underneath or within the pericarps are often longitudinal channels, called *vittas*, filled with an oily or resinous substance. Embryo minute, in a horny albumen, which either fills the seeds or is deeply furrowed or excavated on the inner face.

A numerous family, more or less represented nearly all over the globe; but the species are comparatively few in high northern latitudes, as well as within the tropics, their great centre being western Asia and the Mediterranean region. Their inflorescence, and the structure of their flowers, distinguish them at once from all other families, except that of the *Aralias*, and these have either more than two styles, or the fruit is a berry. But the subdivision of *Umbellifers* into genera is much more difficult. Linnæus marked out several which were natural, but without definite characters to distinguish them; and the modern genera, founded upon a nice appreciation of minute differences in the fruit and seed, are often very artificial, or still more frequently reduced to single species, and require as complete a revision as the *Crucifers* and *Composites*. These minute characters are moreover in many cases

very difficult to ascertain. I have, therefore, in the following Analytical Key, endeavoured to lead to the determination of the species, as far as possible, by more salient though less absolute characters, which may suffice in a great measure for the few British species, although, even for them, the minute variations of the fruit cannot be wholly dispensed with. For this purpose it is essential to have the fruit *quite ripe*. It must then be cut across, and if a horizontal slice is placed under a magnifying-glass, the general form, the ribs and furrows of the pericarp, and the vittas, will clearly appear. Where the fruit is described as *laterally compressed*, this slice will assume an oval form, the division between the carpels being across the narrow diameter; where it is *flattened* from front to back, the division will be across the broadest diameter. In *Seseli* and other genera, where the fruit is not compressed, the horizontal slice will be orbicular. Where the albumen is furrowed, its transverse section will assume more or less of a half-moon or a kidney shape.

- | | | | |
|----|---|---|-------------------|
| 1 | { | Leaves undivided | 2 |
| | { | Leaves palmate or pinnate, or variously dissected | 3 |
| | { | Leaves quite entire, grass-like or ovate. Flowers yellow | 15. BUPLEVER. |
| 2 | { | Leaves rounded, crenate or peltate. Aquatic or marsh plant, with small heads or whorls of flowers | 1. HYDROCOTYLE. |
| | { | Leaves and globular heads of flowers very prickly | 4. ERYNGO. |
| 3 | { | Leaves and stems very thick and succulent | 23. SAMPHIRE. |
| | { | Leaves neither prickly nor fleshy | 4 |
| 4 | { | Fruit covered with prickles or bristles or hairs, or with dentate or sinuate ribs | 5 |
| | { | Fruit glabrous and smooth, or with entire ribs or wings | 12 |
| 5 | { | Leaves orbicular or palmate. Umbels simple or irregularly compound | 6 |
| | { | Leaves pinnate or much dissected. Umbels usually compound | 7 |
| | { | Flowers in small heads, without involucre. Fruit prickly | 2. SANICLE. |
| 6 | { | Flowers in simple or irregularly compound umbels. Involucre of many bracts. Fruit rough, with sinuate or dentate ribs | 3. ASTRANTIA. |
| 7 | { | Fruit covered with bristles or prickles or hairs | 8 |
| | { | Fruit glabrous, with sinuate ribs | 35. HEMLOCK. |
| 8 | { | Fruit flat, with a thick border | 28. HARTWORT. |
| | { | Fruit ovoid, not bordered | 9 |
| 9 | { | Bracts of the involucre mostly pinnatifid | 34. CARROT. |
| | { | Bracts of the involucre entire or none | 10 |
| 10 | { | Umbels of more than 20 rays, with involucres of many bracts, and shortly downy fruits | 19. SESELI. |
| | { | Umbels of few rays (seldom 10). Bracts few or none. Fruits burr-like or very hispid | 11 |
| | { | Fruit contracted at the top into a very short, smooth beak. | |
| 11 | { | | 32. Burr CHERVIL. |
| | { | Fruit covered to the top with hooked bristles | 33. CAUCALIS. |

- 12 { Fruit very much flattened 13
 { Fruit globular, ovoid, or shortly oblong 18
 { Fruit long and narrow, at least four times as long as broad. (Leaves much cut, and often hairy) 46
 13 { Fruit rough, surrounded by a thick edge 28. HARTWORT.
 { Fruit smooth, with a thin or a double edge 14
 14 { Fruit bordered by two thin edges or wings, which are distinct before the fruit ripens. (Tall plant, with numerous ovate segments to the leaves. 24. ANGELICA.
 { Edge of the fruit single until the carpels separate 15
 15 { Leaves much dissected, with narrow or small segments . 25. PEUCEDAN.
 { Leaves consisting of a few large, broad segments 16
 16 { Lower leaves of three large, 3-lobed segments, equal to each other, and with stalks of equal length 25. *Broad* PEUCEDAN.
 { Lower leaves pinnate; or, if ternate, the middle segment longer, with a longer stalk 17
 17 { Flowers yellow, all small 26. PARSNIP.
 { Flowers white, the outer petals of the umbel much larger 27. HERACLEUM.
 18 { Flowers yellow 19
 { Flowers white 22
 19 { Leaves two or three times ternate, with large, broad segments. Fruit of 2 globular carpels 37. SMYRNIUM.
 { Leaves pinnate or much divided. Fruit ovoid or oblong 20
 20 { Leaves very finely divided into filiform segments 18. FENNEL.
 { Segments of the leaves flat, linear-lanceolate or oblong 21
 21 { Ribs of the fruit very prominent, almost winged 21. SILAUS.
 { Ribs of the fruit scarcely prominent 9. *Common* PARSLEY.
 22 { Fertile flowers and fruits, at least the central ones, nearly sessile, surrounded by small, barren, pedicellate flowers. Fruit corky, with prominent calyx-teeth 16. CENANTH.
 { Fertile flowers pedicellate 23
 { Leaves twice or thrice ternate, with large, broad segments (of 2 or 3 inches) 24
 23 { Leaves once pinnate, with several pairs of sessile, ovate, lanceolate, or dissected segments 26
 { Leaves much dissected, with small or narrow segments, the lower ones stalked 30
 24 { Umbels all terminal and peduncled 25
 { Umbels mostly lateral and sessile 6. APIUM.
 25 { No involucre 11. GOUTWEED.
 { Partial involucre of several bracts, general one of very few 20. LOVAGE.
 26 { No involucre 14. PIMPINEL.
 { Involucre at least to the partial umbels 27
 27 { Umbels terminal 28
 { Umbels mostly lateral, almost sessile 29
 28 { Fruit ovoid, about 2 lines long or more 46
 { Fruit ovoid, under 2 lines long 13. SIUM.
 { Fruit nearly globular, not 1 line long 8. SISON.

- | | | | |
|----|---|--|---------------------------------|
| 29 | { | General involucre of several bracts | 13. SIUM. |
| | { | No general involucre, or only a single bract | 7. HELOSCIAD. |
| 30 | { | Umbels mostly lateral, almost sessile | 31 |
| | { | Umbels all terminal or pedunculate | 32 |
| 31 | { | Leaves with few ovate segments | 6. APIUM. |
| | { | Leaves twice or thrice pinnate, with numerous small segments. | 16. <i>Fine-leaved</i> CENANTH. |
| 32 | { | Erect branched annuals (not above 2 feet high) | 33 |
| | { | Perennials or tall biennials | 36 |
| 33 | { | Partial involucre longer than the flowers, and reflexed | 17. ÆTHUSA. |
| | { | Partial involucre shorter than the flowers, or none | 34 |
| 34 | { | Fruit globular or broader than long | 35 |
| | { | Fruit ovoid or longer than broad | 41 |
| 35 | { | Fruit globular, not separating into two | 38. CORIANDER. |
| | { | Fruit separating into 2 small globular carpels | 8. SISON. |
| 36 | { | Fruit of 2 little, globular, bladder-like lobes or carpels | 36. PHYSOSPERM. |
| | { | Fruit nearly globular or broader than long | 37 |
| | { | Fruit ovoid or longer than broad | 41 |
| 37 | { | Partial involucre of several bracts | 38 |
| | { | No involucre | 40 |
| 38 | { | Flowers of a yellowish-green. Ribs of the fruit acute, almost winged. | 21. SILAUS. |
| | { | Flowers white. Ribs of the carpels obtuse, or crisped, or not prominent | 39 |
| | { | Calyx-teeth appearing above the fruit. Leaf-segments narrow. | 5. COWBANE. |
| 39 | { | Calyx-teeth not conspicuous. Leaf-segments numerous, small. | 35. HEMLOCK. |
| 40 | { | Stem erect, not much branched. Leaves pinnately divided with ovate, lanceolate, or linear segments | 14. PIMPINEL. |
| | { | Stem short, with spreading stiff branches. Leaves ternately divided with subulate segments | 10. TRINIA. |
| 41 | { | Leaf-segments divided into numerous subulate lobes, not above 2 lines long, in opposite clusters, appearing whorled along the common stalk | 42 |
| | { | Leaf-segments oblong-lanceolate or linear, and flat | 43 |
| 42 | { | Common stalk of the leaf simple. Fruit not above 2 lines long. | 12. <i>Whorled</i> CARUM. |
| | { | Common stalk branched. Fruit 3 or 4 lines long | 22. SPIGNEL. |
| 43 | { | Rootstock a globular tuber | 44 |
| | { | Rootstock or root not tuberous | 45 |
| 44 | { | Styles closely reflected on the fruit. Ribs of the fruit prominent. Vittas single | 12. <i>Tuberous</i> CARUM. |
| | { | Styles erect. Ribs of the fruit scarcely visible. Vittas several to each interstice | 31. BUNIUM. |
| 45 | { | Umbels of 3 to 5 very unequal rays | 9. <i>Field</i> PARSLEY. |
| | { | Umbels of 7 to 10 rather unequal rays. Calyx-teeth not conspicuous. | 12. <i>Caraway</i> CARUM. |
| | { | Umbels of 10 to 20 rays. Calyx-teeth prominent | 16. CENANTH. |

- 46 { Fruit 10 lines to above an inch long 47
 { Fruit not above half an inch long 48
 47 { Fruit thick, with prominent angles or ribs the whole length 30. *CICELY*.
 { Fruit slightly ribbed at the base, with a long smooth beak 29. *SCANDIX*.
 48 { Fruits mostly sessile or nearly so 16. *CENANTH*.
 { Fruits all pedicellate 32. *CHERVIL*.

I. **HYDROCOTYLE.** HYDROCOTYLE.

Herbs, mostly aquatic, with leaves often peltate. Flowers in a small simple head or umbel, or in 2 or more whorls one above the other. Petals ovate. Fruit laterally compressed, the carpels flat, nearly orbicular, placed edge to edge, with one prominent rib on each side, and without any prominent calycine teeth.

A rather large genus, spread over the greater part of the globe, and, notwithstanding some rather anomalous South African species, readily known as well by its foliage and inflorescence as by its fruit.

1. Common Hydrocotyle. *Hydrocotyle vulgaris*, Linn. (Fig. 391.)

(Eng. Bot. t. 751. *Marsh Pennywort. White-dot.*)



Fig. 391.

The perennial slender stem creeps along the wet mud, or even floats in water, rooting at every node, and emitting from the same point small tufts of leaves and flowers. Leaves orbicular, $\frac{1}{2}$ to 1 inch diameter, crenate or slightly lobed, and attached by the centre to a rather long stalk. Peduncles shorter than the leafstalks, with a single terminal head, or 2 or even 3 whorls of minute white flowers on very short pedicels. Fruits small, flat, and glabrous, about a line in diameter.

In bogs, marshes, edges of ponds and lakes, in temperate Europe, from southern Scandinavia to the Caucasus. Frequent in Britain. *Fl. summer.*

II. **SANICLE.** SANICULA,

Herbs, with a perennial rootstock; palmately divided leaves mostly radical; and erect, almost leafless stems, irregularly branched at the top, each branch ending in a very small head of flowers. Fruit ovoid, covered with short, hooked prickles, and crowned by the 5 prickly teeth at the calyx. Petals minute, obovate, with an inflected point.

A genus of very few species, but widely spread over a great part of the globe without the tropics. They are all readily distinguished among irregular *Umbellates* by their burr-like fruit.

1. **Wood Sanicle.** *Sanicula europæa*, Linn. (Fig. 392.)

(Eng. Bot. t. 98.)

Rootstock short, almost woody. Radical leaves on long stalks, 1 to 2 inches diameter, deeply divided into about 5 palmate segments or lobes, each one obovate or wedge-shaped, dentate or lobed, the teeth ending in a fine point, and often ciliate at the edge; the whole plant otherwise glabrous. Stems 1 to 1½ feet high, leafless or with small trifid leaves or bracts under the branches of the panicle. This usually consists of 3 short branches, each with a single small head of flowers, with a longer branch lower down the stem bearing 3 small heads, but sometimes there are more 3-headed branches forming an irregular umbel. At the time of flowering, the calyx-teeth almost conceal the petals; as the fruit ripens into little burrs of about 2 lines, the prickles almost conceal the calyx-teeth.



Fig. 392.

In woods, throughout Europe except the extreme north, extending eastward into central Asia. Frequent in Britain. *Fl. summer.*

III. **ASTRANTIA.** ASTRANTIA.

Herbs, with a perennial rootstock, and palmately divided leaves, mostly radical. Umbels compact, irregularly compound, with general and partial involucre of several coloured bracts. Flowers often unisexual. Fruit ovoid or oblong, somewhat compressed laterally, crowned by the long pointed teeth of the calyx. Carpels with 5 plaited or crimped ribs, and without vittas.

A small genus, extending over central and southern Europe to the Caucasus. The foliage and involucre, as well as the fruit, mark it out as a very distinct group in the family.

1. **Larger Astrantia.** *Astrantia major*, Linn. (Fig. 393.)

Radical leaves like those of the *Sanicle*, but larger, with more pointed



Fig. 393.

in Herefordshire; probably Originally escaped from some old cottage-garden. *Fl. summer.*

lobes. Stems 2 feet high or more, erect, with 1 or 2 leaves, smaller, and on shorter stalks than the radical ones. General umbel very irregular, of 3 to 5 unequal rays, the involucre of as many coloured and lobed or toothed bracts, with occasionally a bract or two below the middle of each ray. Partial umbels with an involucre of 15 to 20 lanceolate pointed bracts, quite entire, as long or longer than the flowers, either white or tinged with pink. Flowers small, mostly unisexual, the calyx-border campanulate, with 5 teeth about the length of the petals.

In woods and pastures, in central and southern Europe, not nearer to Britain than central France. Occurs apparently wild in Stokesay Wood, near Ludlow, and between Whitbourne and Malvern,

IV. **ERYNGO.** ERYNGIUM.

Stiff, hard herbs, usually perennial, and with very prickly leaves and involucre. Flowers in a compact spike or head, with a scale or bract on the common receptacle under each flower. Petals erect, with a long inflected point. Fruit ovoid, without vittas, crowned by the pointed or prickly teeth of the calyx.

A rather numerous and very natural genus, spread over the greater part of the temperate and warm regions of the globe. In many species the whole of the upper part of the plant as well as the flowers acquire a bluish or white tint, on which account several exotic species have been frequently cultivated in our gardens.

- Radical leaves rounded, the lobes plaited and toothed. Scales of the receptacle 3-lobed 1. *Sea E.*
 Leaves pinnately divided, the lobes pinnatifid and toothed. Scales of the receptacle entire 2. *Field E.*

1. *Sea Eryngo.* *Eryngium maritimum*, Linn. (Fig. 394.)

(Eng. Bot. t. 718. *Sea Holly.*)

A stiff, erect, much branched plant, nearly a foot high, quite gla-

brous, and glaucous or bluish. Leaves very stiff, broad, and sinuate, more or less divided into 3 broad, short lobes, elegantly veined and bordered by coarse, prickly teeth; the radical ones stalked; the others clasping the stem by their broad bases. Heads of flowers nearly globular, of a pale blue, with an involucre of 5 to 8 leaves, like those of the stem, but much smaller and narrower, the bracts within the head divided into 3 prickles.

On the seacoasts of the whole of Europe and western Asia, except the extreme north. Abundant on the maritime sands of England, Ireland, and southern and western Scotland, and has been found as far north as Shetland. *Fl. summer, rather late.*



Fig. 394.

2. Field Eryngo. *Eryngium campestre*, Linn. (Fig. 395.)

(Eng. Bot. t. 57.)

Stems not so thick, and more branched than in the *sea E.*; the leaves much more divided; the segments pinnate, with lanceolate lobes, waved and coarsely toothed, bordered and terminated by strong prickles. Heads of flowers more numerous and smaller; the involucral leaves more or less pinnately toothed; the scales or bracts within the heads narrow, and mostly entire.

In fields, waste places, and roadsides, in central and southern Europe, extending eastward to the Caucasus and Ural, and northward to Denmark. Rare in Britain, and believed by some to be an introduced plant; among several stations formerly given, it is now only known near Plymouth, on the ballast-hills of the Tyne, and near Waterford, in Ireland. *Fl. summer.*

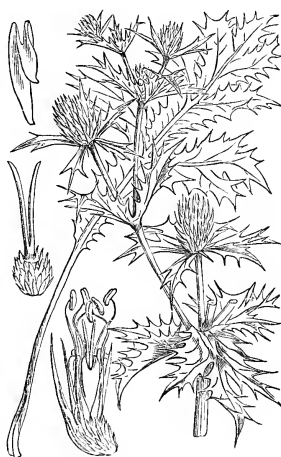


Fig. 395.

V. **COWBANE.** *CICUTA*.

Leaves dissected. Umbels compound, without any general involucre, or only one or two small bracts; the partial involucre of many bracts. Calyx-teeth prominent above the ovary. Petals white, obcordate. Fruit short, laterally compressed; each carpel nearly globular, with 5 scarcely prominent, broad, flat ribs, and single vittas under the furrows.

A genus of very few species, spread over the northern hemisphere; distinguished among the short-fruited *Umbellates* with single vittas chiefly by the prominent teeth of the calyx.

1. **Water Cowbane.** *Cicuta virosa*, Linn. (Fig. 396.)

(Eng. Bot. t. 479. *Cowbane.* *Water Hemlock.*)



Fig. 396.

Stem hollow, somewhat branched, attaining 3 or 4 feet. Leaves twice or thrice pinnate or ternate, with narrow-lanceolate, acute segments, 1 to $1\frac{1}{2}$ inches long, bordered with a few unequal, acute teeth. General umbels of from 10 to 15 or even more rays. Bracts of the partial involucre subulate, not quite so long as the pedicels.

In wet ditches and on the edges of lakes, in northern and central Europe, Russian Asia, and northern America, disappearing in southern Europe. Very local in Britain, and never abundant, although occurring in several counties of England, Ireland, and southern Scotland. *Fl. summer.*

VI. **APIUM.** *APIUM*.

Leaves dissected. Umbels compound. No involucre. Petals entire, white, with a small, inflected point; fruit short, slightly compressed laterally, without visible calycine teeth. Carpels ovoid, with 5 slender ribs, and single vittas under the furrows, and 2 on the face, next the axis; the axis or carpophore free and entire, or shortly split at the top.

A genus which has been differently understood and characterized by

almost every botanist who has studied *Umbellates*, and which has now no claims to be considered either natural or definite. It might be made more so if extended so as to comprise *Helosciad*, and several small exotic ones.

1. **Celery Apium.** *Apium graveolens*, Linn. (Fig. 397.)

(Eng. Bot. t. 1210. *Celery*.)

In its wild state not a stout plant; quite glabrous, 1 to 2 feet high. Leaves pinnate, with 3 or 5 distinct, broad segments, crenate or 3-lobed, from 6 to 9 lines long, the upper leaves very small. Umbels small, nearly sessile on the upper branches opposite the leaves, or on very short terminal peduncles seldom 2 lines above the last leaves; divided into from 3 to 6 rays, and bearing numerous small flowers on short pedicels. Fruits very small, the vittas often very indistinct.

In marshy places near the sea, on the coasts of Europe, Africa, western Asia, and America, but not in high northern latitudes. In Britain it extends as far north as the southern counties of Scotland, and is occasionally found inland, but then mostly escaped from cultivation. *Fl. summer*. The *Celery* of our gardens is a cultivated variety, in which the leafstalk and base of the stem acquire a considerable size.

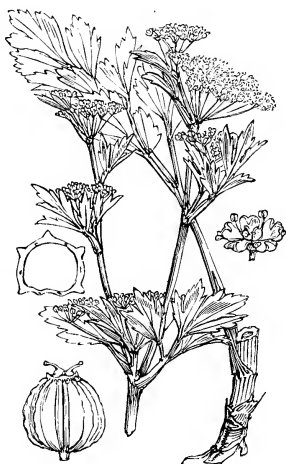


Fig. 397.

VII. **HELOSCIAD.** HELOSCIADIUM.

Leaves dissected. Umbels compound, with partial involucre, and sometimes a general one also. Flowers and fruit of *Apium*, except that there are no vittas on the face of the carpels next the axis.

A small genus, including some American, besides the European and Asiatic species, but which in a general revision would probably all be united with *Apium*.

- Leaves of several pairs of ovate or lanceolate toothed segments. Rays of the umbel about 5 or 6 1. *Procumbent H.*
 Leaf-segments few, usually lobed or divided. Rays of the umbel about 3 or 4 2. *Lesser H.*

1. **Procumbent Helosciad.** *Helosciadium nodiflorum*, Koch. (Fig. 398.)

(*Sium*, Eng. Bot. t. 639.)



Fig. 398.

Stems perennial, creeping, and rooting at the base, the annual flowering branches ascending or nearly erect; attaining several feet in some situations, but usually very much shorter, the whole plant glabrous. Leaves with 3 to 10 or more pairs of ovate or lanceolate toothed segments. Umbels nearly sessile or on short peduncles, either opposite to the leaves or between the upper branches, each with 5 or 6, or rarely as many as 8 or as few as 4 rays. General involucre usually wanting, but sometimes consisting of 3 or 4 narrow-lanceolate bracts; partial involucre of several small, lanceolate bracts.

In marshy meadows, and wet ditches, in western and southern Europe; scarcely eastward of the Rhine in central Europe, but extends nearly all round the Mediterranean. Abundant in England, Ireland, and southern Scotland. *Fl. summer*. It varies much in size and foliage; when very luxuriant the leaf-segments are numerous, narrow, from 1 to 1½ inches long; in half dried-up, open ditches the plant is small, much branched, with 3 to 5 small, broad segments; it will then also creep much more, has the peduncles rather longer, and has been considered as a distinct species (*S. repens*, Eng. Bot. t. 1431), but both forms may be occasionally found proceeding from the same stock.

2. **Lesser Helosciad.** *Helosciadium inundatum*, Koch. (Fig. 399.)

(*Sison*, Eng. Bot. t. 227.)

A glabrous plant, creeping and rooting at the base like the last, but much smaller, and more slender, and often half immersed in water,

when the submerged leaves are divided into capillary segments. Flowering stems 6 to 8 inches high, with small ternate or pinnate leaves; the segments 3-toothed or 3-lobed, each lobe often again 3-toothed. Umbels on short peduncles opposite the leaves, as in the *procumbent H.*, but generally of 2 or 3 rays only, without involucre; the partial umbels of 5 or 6 small flowers, with 2 or 3 minute bracts.

In swamps, shallow ponds and pools, or half-dried mud, chiefly in western and central Europe, extending northwards into southern Sweden, eastwards almost to the Asiatic frontier, but rare in the south. Generally dispersed over Britain, but easily overlooked, and consequently supposed to be more rare than is the fact. *Fl. summer.*

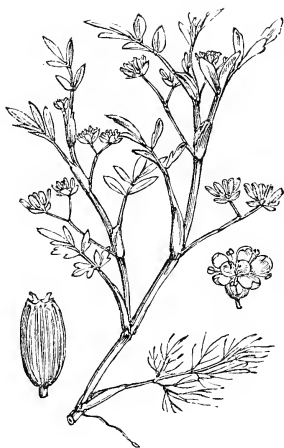


Fig. 399.

VIII. **SISON.** SISON.

Leaves dissected. Umbels compound, with general and partial involucre. Petals broad, deeply notched, with an inflected point. Fruit of *Apium*, except that the axis or carpophore is deeply cleft as in *Parsley*, and the vittas are slightly thickened at the lower end.

A single species, formerly considered as a congener of the *Corn Parsley*.

1. Hedge Sison. **Sison Amomum**, Linn. (Fig. 400.)

(Eng. Bot. t. 945. *Bastard Stone Parsley*.)

An erect, glabrous annual or biennial, 2 feet high or rather more, with numerous stiff, slender branches in the upper part. Leaves pinnate; the segments of the lower ones ovate or oblong, often an inch long, toothed or lobed, or the lower pair again pinnate; the upper leaves much smaller, with small, narrow segments, deeply 3-lobed, toothed or entire. Umbels on slender peduncles of 3 to 5 rays, with but few white flowers on short pedicels. Involucres of very few, linear



Fig. 400.

bracts, those of the partial umbels smaller, and often turned to one side. Fruit scarcely above a line long, rather broader than long.

In hedges and thickets, chiefly in western Europe, not reaching the Rhine in central Europe, but spreads here and there much further eastward in the Mediterranean region. In Britain, frequent in southern England; more rare in the north, scarcely penetrating into Scotland, and not recorded from Ireland. *Fl. summer.*

IX. PARSLEY. PETROSELINUM.

Leaves dissected. Umbels compound, with general and partial involucre of very few bracts. Petals entire. Fruit of *Apium*, except that the axis of the carpophore splits to the base when ripe.

Two European species, not much like each other, nor yet like the few exotic ones artificially associated with them.

Tall biennial. Flowers yellow	1. <i>Common P.</i>
Slender annual. Flowers white	2. <i>Corn P.</i>

1. Common Parsley. *Petroselinum sativum*, Hoffm. (Fig. 401.)

(Eng. Bot. Suppl. t. 2793.)

An erect, glabrous biennial, or sometimes lasting 3 or 4 years, 1 to 2 feet high, with a thick root and stiff branches. Leaves triangular in their general outline, twice pinnate; the segments stalked, ovate, lobed and toothed; the upper leaves less divided, with narrow, often linear, entire segments. Umbels all stalked, not very large, but with 15 to 20 or even more rays; the general involucre consisting of 2 to 4 or 5 short linear bracts, the partial ones of several smaller bracts. Flowers rather small, of a greenish-yellow.

A native apparently of the eastern Mediterranean region, much cultivated throughout Europe, and often establishes itself in waste places. In Britain it appears quite naturalized in maritime rocks in several parts of northern and western England. *Fl. summer.*



Fig. 401.

2. Corn Parsley. *Petroselinum segetum*, Koch. (Fig. 402.)

(*Sison*, Eng. Bot. t. 228.)

A glabrous, much branched, slender annual, 9 to 18 inches high or sometimes more. Leaves chiefly radical, not unlike those of the *common Pimpinell*, but smaller, simply pinnate, with 5 to 10 pairs of sessile, ovate, toothed or lobed segments 3 to 6 lines long; the upper leaves few and small, merging into linear bracts. Umbels very irregular, the rays few and very unequal; the partial umbels containing but few flowers, some quite sessile, others on pedicels varying from 1 to 6 lines in length. Flowers small, white. Fruit $1\frac{1}{2}$ to 2 lines long, often curved by the abortion of one of the carpels.

In fields and waste places, dispersed over central Europe and western Asia, but apparently wanting both in the north and in the south. In Britain only in southern and central England. *Fl. summer and autumn.* Much nearer allied in habit to the *Caraway* and to the *hedge Sison* than to *Parsley*.



Fig. 402.

X. **TRINIA.** TRINIA.

Leaves dissected. Umbels compound, without involucre, or with a single bract. Flowers diœcious. Petals entire, with an inflected point. Fruit short, somewhat laterally compressed, without visible calycine teeth. Carpels ovoid, with 5 prominent ribs, and single vittas, under or within the ribs themselves, not under the interstices, as in most *Umbellates*.

A very small genus, chiefly south European and west Asiatic, with a peculiar habit, and differing from *Apium* chiefly in the diœcious flowers, and the position of the vittas of the fruit.

1. **Common Trinia.** *Trinia vulgaris*, DC. (Fig. 403.)

(*Pimpinella dioica*, Eng. Bot. t. 1209.)

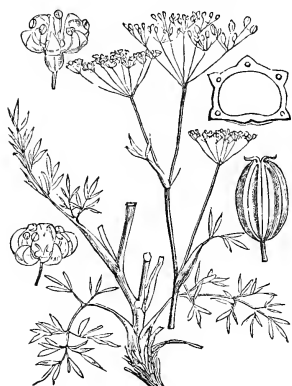


Fig. 403.

Stock perennial, short and thick, almost woody, forming a tap-root at its base. Stems annual, erect, stiff and angular, with numerous spreading branches, 6 inches to near a foot high, the whole plant glabrous, with a glaucous hue. Leaves finely cut into stiff, narrow-linear or subulate segments; the radical ones twice pinnate, with ternate, entire segments, 3 to 6 lines long, the upper ones twice or only once ternate. Umbels small and numerous, on slender peduncles, forming a loose panicle, each with 4 to 6 rays. Flowers white, the males with much narrower petals than the females.

In dry, arid, and stony wastes, chiefly in limestone districts, in western and southern Europe to the Caucasus, scarcely extending into central Germany. Rare in Britain, and confined to the south-western counties of England and to southern Ireland. *Fl. spring or early summer.*

XI. **GOUTWEED.** ÆGOPODIUM.

Leaves dissected. Umbels compound, without any involucre. Petals broad, notched, with an inflected point. Fruit ovoid-oblong,

somewhat laterally compressed, without visible calycine teeth. Carpels with 5 slender ribs and no vittas.

A single species, differing from *Carum* in habit and in the absence of vittas.

1. Common Goutweed. *Ægopodium Podagraria*, Linn.
(Fig. 404.)

(Eng. Bot. t. 940. *Goutweed*. *Bishopweed*.)

A coarse, erect, glabrous perennial, $1\frac{1}{2}$ to 2 feet high, with a creeping rootstock. Radical leaves on long stalks, twice ternate; the segments ovate or ovate-lanceolate, sharply toothed, 2 to 3 inches long, the terminal ones rounded at the base, the lateral ones obliquely cordate or sometimes lobed. Stem-leaves few, less divided, with smaller segments. Umbels rather large, with 12 to 20 or even more rays, with numerous white flowers. Fruit about 2 lines long, the styles closely deflected upon it.



Fig. 404.

In moist woods and thickets, widely spread over Europe and Russian Asia, except the extreme north. Having been much cultivated for medicinal purposes, and spreading readily by its creeping rootstocks, it is not always truly indigenous, although a troublesome weed in gardens. In Britain it is common, but chiefly about houses and gardens, and therefore probably introduced. *Fl. summer*.

XII. **CARUM.** CARUM.

Leaves dissected, with narrow segments. Umbels compound, with involucre of several small bracts or none. Petals broad, notched, with an inflected point. Fruit oval-oblong, somewhat laterally compressed, without visible calycine teeth. Carpels with 5 not very prominent ribs, and 1, 2, or 3 vittas under each furrow.

A considerable genus, chiefly spread over southern Europe and

central Asia, differing from *Apium* in the notched petals and the shape of the fruit.

Stock short, covered with the remains of old leafstalks. Lower leaves pinnate, with many distinct segments.

Segments of the leaves very numerous, short, fine, and nearly equal, apparently clustered or whorled along the main leafstalk 1. *Whorled C.*

Segments gradually diminishing in length from the base to the top of the leaf 2. *Caraway C.*

Rootstock a globular tuber. Lower leaves twice or thrice

ternate 3. *Tuberous C.*

1. Whorled Carum. *Carum verticillatum*, Koch. (Fig. 405.)

(*Sison*, Eng. Bot. t. 395.)



Fig. 405.

Perennial stock short and thick, covered with the decayed bases of old leafstalks, the fibrous roots slightly thickened, the erect annual stems 1 to 1½ feet high. Leaves mostly radical, consisting of from 12 to 20 pairs of opposite segments, about 2 or 3 lines long, divided to the base into a number of fine subulate lobes, so as to appear like whorls or clusters of segments placed at regular distances along the common stalk, the whole leaf being 4 to 6 inches long. Stem-leaves similar, but few and small. Umbels terminal, not large, of 8 to 10 rays. Involucres, both general and partial, of several very small, linear bracts.

In heaths and bogs, in western Europe, from the Spanish Peninsula to Belgium. In Britain, common in some parts of Wales and Ireland, and in western Scotland. *Fl. summer and autumn.*

2. Caraway Carum. *Carum Carvi*, Linn. (Fig. 406.)

(Eng. Bot. t. 1503. *Caraway*.)

A biennial, forming a tap-root, and perhaps occasionally a perennial stock. Stem erect, branched, 1½ to 2 feet high. Leaves with a rather

long sheathing footstalk, pinnate, with several pairs of segments, which are sessile, but once or twice pinnate, with short linear lobes; in a leaf of 3 or 4 inches, the lowest or next to the lowest segments are about $\frac{3}{4}$ of an inch long, the others diminishing gradually to the top. Upper leaves smaller and less divided. Umbels of about 8 or 10 rays, either without involucres or with 1 or 2 small linear bracts. Carpels (commonly called *Caraway-seeds*) about 2 lines long, linear-oblong, and usually curved, with the ribs prominent.

In meadows, and moist pastures, in the greater part of Europe and Russian and central Asia, from the Arctic regions to the Mediterranean and Himalaya, more rare in western Europe. Occurs in many parts of Britain; if not truly indigenous, at any rate well naturalized, having been long cultivated for its aromatic carpels. *Fl. spring and early summer.*

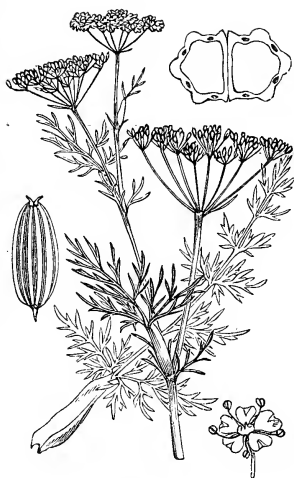


Fig. 406.

3. Tuberous Carum. *Carum Bulbocastanum*, Koch.

(Fig. 407.)

(*Bunium*, Eng. Bot. t. 1524, Suppl. t. 2862.)

Resembles the *tuberous Bunium*, and, like that species, the stock forms globular, underground tubers, known by the name of *Earthnuts* or *Pignuts*. Radical leaves (which usually disappear at the time of flowering) twice or three times ternate; the segments all stalked and pinnately divided into a small number of linear lobes, less unequal than in the *tuberous Bunium*. Involucres always present, consisting of a few very fine bracts. Carpels like those of the *Caraway*, but more slender, with the ribs rather less prominent, although more so than in the *tuberous Bunium*, and the face of the seed is flat or slightly concave, not furrowed as in the *Bunium*. Vittas single under each interstice.



Fig. 407.

In dry pastures, on banks, roadsides, etc., especially in limestone districts, in central and southern Europe, and central Asia, scarcely extending into central Germany. In Britain, not generally diffused, but said to be abundant in some parts of Hertfordshire, Cambridgeshire, and adjoining counties. Not recorded from Ireland. *Fl. summer.*

XIII. **SIUM.** SIUM.

Leaves pinnate. Umbels compound, with general and partial involucres. Calyx-teeth often prominent. Petals white, notched with an inflected point. Fruit broadly ovoid, somewhat compressed laterally. Carpels with 5 slender ribs, and several vittas under each interstice.

A small genus, spread over almost all temperate regions of the globe; resembling *Apium* in the shape of the fruit, but with the calyx-teeth usually prominent as in *Cowbane*, and differing from both in the more numerous vittas.

Stem usually 3 or 4 feet. Umbels all terminal; rays usually

15 to 20 1. *Broad S.*

Stem much branched, seldom above 2 feet. Umbels mostly

lateral; rays usually 10 to 15 2. *Lesser S.*

1. **Broad Sium.** *Sium latifolium*, Linn. (Fig. 408.)

(Eng. Bot. t. 204. *Water Parsnip.*)



Fig. 408.

A glabrous perennial, with a creeping rootstock, and stout erect stems 2 to 4 feet high. Lower leaves very long, with 6 to 10 pairs of ovate-lanceolate segments, sessile on the common stalk, toothed or rarely slightly lobed, often 2 to 4 inches long; the upper leaves shorter, with fewer and smaller segments. Umbels rather large, of 15 to 20 rays, and all terminal. Involucres, both general and partial, of several lanceolate bracts, often toothed. Fruits about $1\frac{1}{2}$ lines long and broad, the small pointed teeth of the calyx usually very distinct.

In wet ditches and on the edges of streams, throughout Europe, except the extreme north; replaced in Asia by a

closely allied species or variety. In Britain, not unfrequent in southern and central England and in Ireland, more rare in the north, and very local in southern Scotland. *Fl. summer.*

2. Lesser Sium. *Sium angustifolium*, Linn. (Fig. 409.)

(Eng. Bot. t. 139.)

Resembles the *broad S.*, but is not so tall, more branched and leafy, seldom 2 feet high, and in dried-up ditches often less than a foot, and decumbent. Segments of the leaves smaller, 8 to 10 pairs in the lower leaves, fewer in the upper ones, from ovate to ovate-lanceolate, more deeply and sharply toothed or lobed than in the *broad S.* Umbels more numerous, smaller, on shorter peduncles, mostly lateral, with 8 to 12 or 15, rarely more, rays. Involucral bracts varying from broad-lanceolate to linear, often toothed. Fruit smaller than in the *broad S.*, the ribs less prominent, the vittas less superficial, the calyx-teeth very minute.



Fig. 409.

In wet ditches, and shallow streams, throughout temperate and southern Europe and western Asia, from south Sweden to Persia. In Britain, rather more common than the *broad S.*, in the greater part of England and Ireland, but becoming scarce in northern England and southern Scotland. *Fl. summer.*

XIV. PIMPINEL. PIMPINELLA.

Leaves dissected. Umbels compound, without involucre. Petals broad, notched with an inflected point. Fruit short, somewhat laterally compressed, without visible calycine teeth. Carpels with 5 scarcely prominent ribs, 2 or 3 vittas under each interstice, and several vittas on the inner face.

The genus, as now usually limited, contains a considerable number of species, chiefly from the Mediterranean region and west-central Asia. The shape of the fruit is nearly that of *Apium*, but the ribs are much less prominent, and the vittas more numerous.

- Segments of the lower leaves either nearly orbicular or very much divided 1. *Common P.*
 Segments of most of the leaves ovate or lanceolate; the teeth or lobes very pointed 2. *Greater P.*

The *Aniseed* is the fruit of a species of this genus (*P. Anisum*).

1. **Common Pimpinell.** *Pimpinella Saxifraga*, Linn.
 (Fig. 410.)

(Eng. Bot. t. 407. *Burnet Saxifrage*.)



Fig. 410.

Stock short and thick, but not tuberous. Stems erect, 1 to 2 feet high, not much branched, glabrous or downy at the top. Leaves very variable, the radical ones usually pinnate, with 7 to 9 pairs of broadly ovate or orbicular segments, 6 to 9 lines long, toothed or lobed; the upper leaves small, their segments divided into a few narrow, or even linear lobes: sometimes all, even the radical leaves, have their segments once or twice pinnate, with narrow lobes; sometimes, again, the few stem-leaves are, like the radical ones, simply pinnate, but much smaller, or reduced to simple bracts. Umbels terminal, with from 10 to 15 rather slender rays; the flowers white.

In pastures, on banks, roadsides, etc., throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. all summer.*

2. **Greater Pimpinell.** *Pimpinella magna*, Linn. (Fig. 411.)

(Eng. Bot. t. 408.)

Very near the *common P.*, and perhaps a mere variety. It is much larger in all its parts; the stems often more than 2 feet high, and stouter; the segments of the leaves usually undivided, ovate or lanceolate, often 1 to 1½ inches long, with more pointed teeth, or, if divided, the lobes much longer and more pointed than in the *common P.*, the flowers frequently pink, in larger umbels, and the fruit also larger.

The general range is nearly the same as that of the *common P.*, but it is more frequent in mountainous districts and shady situations, or rich soils. In Britain, chiefly in southern and eastern England and southern Ireland. *Fl. summer, rather late.* It is probable that a further study of intermediate forms, which are frequent in the south of Europe, will induce its reunion with the *common P.* as a marked variety.



Fig. 411.

XV. BUPLEVER. BUPLEVRUM.

Leaves quite entire. Umbels compound, or sometimes small and irregular, with partial and usually also general involucre. Petals broad, entire, yellow. Fruit ovoid or oblong, somewhat laterally compressed, without visible calycine teeth. Carpels with 5 more or less prominent ribs, with or without vittas.

A considerable genus, widely diffused over the temperate regions of the old world, and one of the few natural ones among *Umbellates*, but distinguished more by its entire leaves, with parallel veins and yellow flowers, than by the carpological characters, which in different species correspond to different short-fruited genera.

Leaves broad and perfoliate. Bracts of the partial involucre

broadly ovate 1. *Hare's-ear B.*

Leaves narrow and grasslike.

Annuals. Rays of the umbel few, very short, or inconspicuous.

Umbels of 3 or 4 short rays. Bracts lanceolate, longer than the flowers 2. *Narrow B.*

Flowers 2 or 3 together, in little heads along the slender wiry stems. Bracts very small 3. *Slender B.*

Perennials. Umbels of 4 to 8 rays. Bracts shorter than the rays 4. *Falcate B.*

The *B. fruticosum*, a shrubby south European species, used formerly to be much planted in our shrubberies, but is now more seldom met with, being rather tender.

1. Hare's-ear Buplever. *Buplevrum rotundifolium*, Linn.
(Fig. 412.)

(Eng. Bot. t. 99. *Hare's-ear* or *Thorow-wax*.)



Fig. 412.

An erect, stiff, glabrous annual, a foot or rather more high, and remarkable for its broadly ovate leaves, the upper ones embracing the stem, and joined round the back of it, so that they appear *perfoliate* or pierced through by the stem, the lowest leaves tapering to a stalk. Umbels terminal, of 3 to 5, or rarely 6, short rays, without any general involucre; the partial involucre very much longer than the flowers, consisting of 4 to 6 broadly ovate, yellowish bracts very unequal in size, the largest about 6 lines long.

A cornfield weed, apparently indigenous to the Mediterranean region, but now widely spread over Europe and western Asia, and introduced into North America. Occurs not unfrequently in cornfields in chalky soils in England, but neither in Ireland nor Scotland. *Fl. with the corn*.

2. Narrow Buplever. *Buplevrum aristatum*, Bartl.
(Fig. 413.)

(*B. Odontites*, Eng. Bot. t. 2468.)

An erect annual, slender but stiff, not much branched, from 2 or 3 inches to near a foot high. Leaves narrow-linear and grasslike, but rather stiff, 1 to 2 inches long. Umbels small, terminal, of 2 to 6 very short rays. Involucres of about 5 lanceolate, green bracts ending in a fine point; the general one usually longer than the rays; the partial ones rather shorter, but still far exceeding the flowers.

In stony wastes, very abundant in southern Europe and eastward to the Caucasus, more scarce in central Europe. In Britain, only in the neighbourhood of Torquay, and in the Channel Islands. *Fl. summer.*



Fig. 413.

3. Slender Buplever. *Buplevrum tenuissimum*, Linn.

(Fig. 414.)

(Eng. Bot. t. 478.)

A slender, wiry annual, either simple and nearly erect, or more frequently divided from the base into several decumbent or ascending branches, 6 inches to a foot high. Leaves few, narrow-linear and grasslike, the upper ones very short. Flowers in little heads of 3 or 4, nearly sessile along the upper part of the stem and branches, sometimes forming little, irregularly compound umbels at the top. Involucres of a few small, linear, pointed bracts. Fruits more conspicuous than in the other species, and covered with little raised dots or granules between the ribs.

On heaths, barren wastes, and stubbles, common in central and southern Europe, especially near the sea, extending eastward to the Caucasus, and northwards to southern Sweden. Occurs in most of the maritime counties of England, and occasionally also found inland, but neither in Ireland nor Scotland. *Fl. late in summer.*

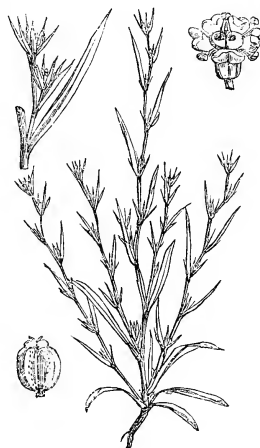


Fig. 414.

4. **Falcate Buplever.** *Buplevrum falcatum*, Linn.

(Fig. 415.)

(Eng. Bot. Suppl. t. 2763.)



Fig. 415.

Stems stiff and erect, slightly branched, 1 to $1\frac{1}{2}$ feet high, forming at the base a short perennial stock. Leaves linear and grasslike, the radical ones often stalked and rather broader. Umbels terminal and compound, of 4 to 8 rays; the general involucre of 3 or 4 oblong or lanceolate bracts, very much shorter than the rays; those of the partial involucre also lanceolate, of a yellowish green, scarcely as long as the flowers.

In open woods, bushy wastes, and heaths, abundant in the hilly districts of central and southern Europe, and in central and temperate Russian Asia, but scarcely further to the north than southern Belgium. In Britain, only on Norton Heath, near Ongar, in Essex. *Fl.* August.

XVI. **ŒNANTH.** ŒNANTHE.

Leaves dissected. Umbels compound, with partial and sometimes also general involucre, of several small, narrow bracts. Flowers of the circumference usually barren and with larger petals; the fertile ones in the centre sessile, or on very short, often thickened pedicels. Petals notched, with an inflected point. Fruits from ovate to narrow-oblong, crowned with the 5 small calycine teeth. Carpels somewhat corky, with 5 obtusely convex ribs, and single vittas under the furrows.

A rather natural genus, spread over Europe, Asia, and North America, most of the species frequenting wet meadows, and marshes, or even growing in water.

Segments of the upper leaves few, long and linear.

Stems very hollow. Central umbel fertile, of 3 rays; those

of the branches barren, of several rays 1. *Common Œ.*

- Stems nearly solid. All the umbels of several rays, with
 fertile and barren flowers 2. *Parsley* *Æ*.
 Segments of the stem-leaves numerous, broadly cuneate, or
 short and oblong.
 Umbels terminal and large. Segments of the leaves at
 least half an inch long 3. *Hemlock* *Æ*.
 Umbels mostly opposite to the leaves. Leaf-segments
 small 4. *Fine-leaved* *Æ*.

1. Common *Ænanth*. *Ænanthe fistulosa*, Linn.

(Fig. 416.)

(Eng. Bot. t. 363. *Water Dropwort*.)

Stock (probably the offset of the previous autumn) emitting creeping runners, with a cluster of fibrous roots, usually more or less thickened into oblong tubers. Stems thick and very hollow, erect, 2 to 3 feet high, and slightly branched. Radical leaves twice pinnate, with small cuneate segments divided into 3 or 5 lobes; those of the stem have long stalks, hollow like the stems, and bear only in their upper extremity a few pinnate segments with linear lobes. Umbels terminal, the central one on the main stem has only 3 rays, each with numerous sessile fertile flowers, and few or no pedicellate barren ones; those which terminate the branches have usually 5 rays, their flowers all pedicellate and barren. Partial involucre of a few small narrow bracts, the general one either entirely wanting or reduced to a single bract. Fruits in compact globular heads, each one full 2 lines long, narrowed at the base, and crowned by the stiff, narrow teeth of the calyx, and the still longer, rigid styles.



Fig. 416.

In wet meadows and marshes, dispersed over temperate Europe, extending eastward to the Caucasus, and northward into southern Sweden. Common in England and Ireland, but only in the southern counties of Scotland. *Fl. summer and autumn*.

2. Parsley *Ænanth*. *Ænanthe pimpinelloides*, Linn.
(Fig. 417.)

(Eng. Bot. t. 347 and 348. *Æ. Lachenalii* and *Æ. silaifolia*, Brit. Fl.)



Fig. 417.

A perennial, with clustered fibrous roots, swelling into round, ovoid, or oblong tubers, at a greater or less distance from the stock, or, in very wet places, remaining sometimes slender throughout. Stems erect, firmer and more solid than in the *common* *Æ.*, 1 to 2 feet high or sometimes more, with a few long branches. Leaves much more divided than in the last species, but very variable; the upper ones usually with long, narrow segments, those of the radical leaves much shorter and broader, and sometimes very numerous. Umbels of 8 to 15 rather short rays; the general involucre of a few small, linear bracts, or sometimes wanting; the partial ones of several small, linear bracts. The fertile sessile or shortly pedicellate flowers,

and the distinctly pedicellate barren ones, are mixed in the same umbels; the persistent styles on the ripe fruits much shorter than in the *common* *Æ.*

In meadows, pastures, and marshes, throughout central and southern Europe, extending northwards to the Baltic, and eastward to the Caucasus. Abundant in many parts of England and Ireland, but does not penetrate far into Scotland. *Fl. summer and autumn.* The great variations in the tubers of the roots and in the form of the radical leaves has induced its division into two, three, or four species. These differences have, however, been shown to depend often on soil and situation; at the same time rather more constant differences have been pointed out in the fruiting umbels, although even here intermediate states show that the two following should be considered rather as marked varieties than as true species.

a. *Meadow Parsley* *Æ.* (*Æ. pimpinelloides*, Brit. Fl.) Flowers assuming occasionally a faint tinge of yellowish-green. Fruiting pedicels (although very short) enlarged at the top so as to form a callosity round the base of the fruit, which is itself fully as broad at the base as at the top. In dry or moist, but not marshy meadows and pastures, and the commonest form in inland situations.

b. *Marsh Parsley* *Æ. (Æ. Lachenalii*, Brit. Fl.) Flowers of a purer white; the fruiting pedicels less conspicuous, but little enlarged at the top; the fruits either cylindrical or narrowed at the base. In wet marshes, and especially in maritime salt-marshes.

3. Hemlock *Ænanth*. *Ænanthe crocata*, Linn. (Fig. 418.)

(Eng. Bot. t. 2313.)

A stout, branched species, attaining 3 to 5 feet; the root-fibres forming thick, elongated tubers close to the stock; the juice both of the stem and roots becoming yellow when exposed to the air. Leaves twice or thrice pinnate; the segments much larger than in the other species, always above half an inch long, broadly cuneate or rounded, and deeply cut into 3 or 5 lobes. Umbels on long, terminal peduncles, with 15 to 20 rays, 2 inches long or more; the bracts of the involucre small and linear, several in the partial ones, few or none under the general umbel. The pedicellate flowers at the circumference of the partial umbels are mostly but not always barren, the central fertile ones almost sessile. Fruit somewhat corky, the ribs broad and scarcely prominent.

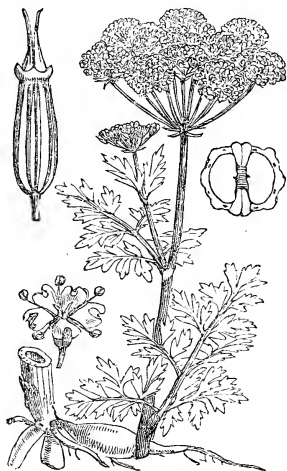


Fig. 418.

In wet ditches, and along rivers and streams in western Europe, extending eastward into Italy, but not into central France. Common in England, Ireland, and southern Scotland. *Fl. summer*.

4. Fine-leaved *Ænanth*. *Ænanthe Phellandrium*, Lam.

(Fig. 419.)

(*Phellandrium aquaticum*, Eng. Bot. t. 684.)

Stem rooting at the base, and either thickened and erect, or elongated and creeping, or floating, according to the situation it grows in, the flowering branches erect or ascending. Stem-leaves twice or thrice pinnate, with small oblong and entire, or cuneate and lobed segments; or, when under water, all the lobes are narrow and long, sometimes capillary. Umbels much smaller than in the *Hemlock* *Æ.*,



Fig. 419.

and almost all on very short peduncles, either opposite to the leaves or in the forks of the branches. Rays seldom above 12. No general involucre, and but very small, narrow bracts to the partial ones. Fruits rather different from those of the other species, being shortly pedicellate, cylindrical, with scarcely prominent, broad ribs, and the calycine teeth very minute.

In wet ditches, ponds, and along rivers and streams, throughout the temperate parts of Europe and Russian Asia. Not uncommon in England and Ireland, but very rare in Scotland. *Fl. summer*. A variety growing usually in deeper or running water, with the lower part of the stem much elongated and slender, has been distinguished as a species, under the name of *Æ. fluviatilis* (Eng. Bot. Suppl. t. 2944).

XVII. *ÆTHUSA*. *ÆTHUSA*.

Leaves dissected. Umbels compound, with partial involucre. Petals white, notched, with an inflexed point. Fruit ovoid, not laterally compressed, without visible calycine teeth. Carpels with 5 thick, prominent ribs, and narrow furrows, with a vitta under each.

A single species, differing from *Seseli* more in habit than in character.

1. Common *Æthusa*. *Æthusa Cynapium*, Linn. (Fig. 420.)

(Eng. Bot. t. 1192. *Fool's Parsley*.)

An erect, glabrous, leafy annual, 1 to 2 feet high, with forked branches, emitting a nauseous smell when rubbed. Leaves of a bright green, twice or thrice pinnate, the segments ovate-lanceolate, more or less deeply cut into narrow lobes. Umbels on long peduncles, either terminal or opposite to the leaves, of 8 to 12 rays, usually without general involucre. Partial involucre of 2 or 3 long, linear bracts, turned downwards towards the outside of the umbels, a character

peculiar to this species among British *Umbellates*. Fruit about $1\frac{1}{2}$ lines long, with very small reflected styles.

A common weed in fields and gardens, throughout Europe and Russian Asia, except the extreme north. Abundant in England, but does not appear to extend far north into Scotland. *Fl.* *summer and autumn.*



Fig. 420.

XVIII. FENNEL. FENICULUM.

Leaves finely dissected. Umbels compound, without involucre. Petals yellow, entire, inflexed at the top, but not pointed. Fruit oval, slightly compressed laterally, without visible calycine teeth. Carpels with 5 prominent ribs, and single vittas under the furrows.

A single, or perhaps two species, with the yellow flowers and habit of *Anethum* (or *Dill-seed*), from which it has been separated, as having the fruit somewhat laterally compressed, not flattened from front to back.

1. Common Fennel. *Fœniculum vulgare*, Gært. (Fig. 421.)

(*Anethum Fœniculum*, Eng. Bot. t. 1208.)

Stock perennial, but usually of short duration. Stems erect, branched, 2 or 3 feet high, or when cultivated, still taller. Leaves 3 or 4 times pinnate, with very narrow, linear or subulate segments, rather stiff in dry situations, very slender when cultivated. Umbels rather large, of 15 to 20, or more rays, more or less glaucous. Fruit about 3 lines long, the vittas very conspicuous.

On dry, rocky banks, apparently of south European origin, but has



Fig. 421.

long been much cultivated, and establishes itself readily in stony or arid hilly situations, especially near the sea, so that it is now generally diffused over temperate Europe and western Asia. Occurs in many parts of Britain, and may be even indigenous on some points of the coasts of England and Ireland. *Fl. late in summer, and autumn.*

XIX. SESELI. SESELI.

Leaves dissected. Umbels compound, with partial and sometimes general involucre of several bracts. Petals white, usually notched, with an inflected point. Fruit ovoid or oblong, not compressed, the calycine teeth usually prominent. Carpels with 5 prominent, often thick ribs, and single, or rarely 2 or more vittas under each furrow.

A considerable genus, widely spread over the northern hemisphere in the old world. The British species belongs to a section differing from the more common ones in habit, and in the hairy fruit, and is united by some with the southern genus *Athamanta*, by others considered as an independent genus under the name of *Libanotis*.

1. Mountain Seseli. *Seseli Libanotis*, Koch. (Fig. 422.)

(*Athamanta*, Eng. Bot. t. 138.)

Stock perennial, short, covered with the decayed remains of old leaf-stalks. Stems stout, erect, 1 to 2 feet high, slightly branched. Leaves chiefly radical, thrice pinnate, with small ovate or lanceolate, pinnately lobed segments; the stem-leaves few, and much smaller. Umbels of 20 to 30 or more rays, with numerous narrow bracts, both to the gene-

ral and the partial involucre. Flowers white, crowded. Fruits always hairy, and there is often a minute whitish down on the stems, petioles, and umbels.

In hilly pastures, in central and eastern Europe and Russian Asia, less frequent in the west, and wanting in the south. In Britain, limited to the counties of Hertford, Cambridge, and Sussex. *Fl. summer.*



Fig. 422.

XX. **LOVAGE.** *LIGUSTICUM.*

Leaves dissected. Umbels compound, with partial involucre of many bracts. Petals white, notched, with an inflected point. Fruit ovoid or oblong, not compressed, the calycine teeth scarcely distinct. Carpels with 5 very prominent acute ribs, almost expanded into wings, and several vittas under each furrow.

A genus of several European, Asiatic, and North American species, chiefly mountain plants, differing from *Seseli* in the acute ribs of the fruit, and indistinct calycine teeth.

1. **Scotch Lovage.** *Ligusticum scoticum*, Linn.

(Fig. 423.)

(Eng. Bot. t. 1207.)

Stock perennial, descending into a tap-root. Stem erect, glabrous, thick and hollow, 1 to 2 feet high, slightly branched. Lower leaves on long stalks, deeply divided into 3, each branch bearing 3 broadly ovate or obovate toothed segments, or 1 segment deeply divided into 3.

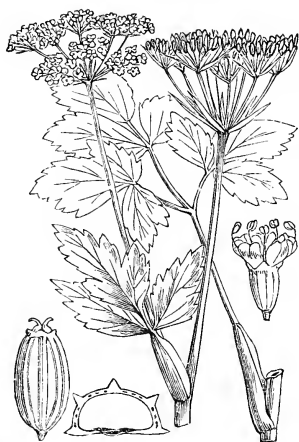


Fig. 423.

lobes, each segment above an inch long. Upper leaves less divided, with short stalks. Umbels of 12 to 20 rays, with a general involucre of 2 or 3 very narrow bracts, and more numerous ones to the partial umbels. Fruits near 4 lines long.

A high northern plant, extending all round the Arctic Circle. Common on the rocky seacoasts of Scotland and northern Ireland, descending also to the north of England. *Fl. summer.*

XXI. **SILAUS.** SILAUS.

Leaves dissected. Umbels compound, with partial involucre of several bracts. Flowers yellowish. Petals scarcely notched. Fruit nearly of *Lovage*, ovoid, but slightly compressed, and with the ribs scarcely acute.

A genus of two or three European and Asiatic species, but slightly differing from *Lovage* chiefly in the colour of the flowers.

1. Meadow Silaus. *Silaus pratensis*, Bess. (Fig. 424.)

(*Peucedanum Silaus*, Eng. Bot. t. 2142. *Pepper Saxifrage*.)

A glabrous, erect perennial, 1 to 2, or sometimes near 3 feet high, slightly branched. Leaves once, twice, or three times pinnate; the segments not numerous, narrow-oblong, $\frac{1}{2}$ to 1 inch long, entire or 3-lobed. Umbels all terminal, not large, of about 6 to 8 rays. General involucre usually of 1 or 2 small bracts, with several small narrow-linear ones to the partial umbels. Flowers of a pale greenish-yellow. Carpels about 2 lines long.

In meadows, and moist, bushy pastures, throughout Europe and Russian Asia, except the extreme north. In Britain, spread over England and southern Scotland, but scarce in the western counties and in Ireland. *Fl. summer, rather late.*



Fig. 424.

XXII. SPIGUEL. MEUM.

Leaves finely dissected. Umbels compound, with partial involucre of several bracts. Petals white or pink, entire, with an incurved point. Fruit oblong, without distinct calycine teeth. Carpels with 5 prominent, acute ribs, and 2 or 3 vittas under each furrow.

A genus of two or three European species, differing by characters of very little importance from *Lovage*, with which some botanists unite it.

1. Common Spiguel. *Meum Athamanticum*, Jacq. (Fig. 425.)

(Eng. Bot. t. 2249. *Spiguel*, *Meu*, or *Baldmoney*.)

Stock short, perennial, covered with the fibrous remains of old leaves, and emitting a tuft of radical leaves; their segments deeply cut into numerous very fine, but short lobes, so as to have the appearance of being whorled or clustered along the common stalk, as in the *whorled Carum*, but the stalk itself is once or twice pinnately divided, not simple as in that plant. Stems 1 or rarely near 2 feet high, with a very few smaller and less divided leaves. Umbels terminal, not

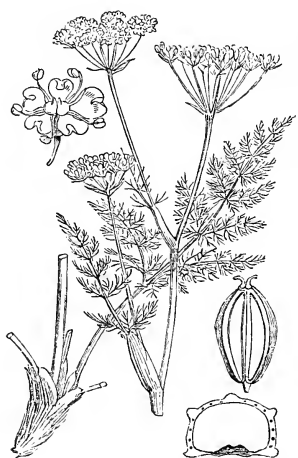


Fig. 425.

large, of 10 to 15 rays, with one or two narrow bracts to the general one, and partial involucre of a small number of short, slender bracts. Fruits about 4 lines long.

In mountain pastures, in western and central Europe, not extending eastward beyond the Russian frontier, nor northward into Scandinavia. Not unfrequent in the Scotch Highlands, in northern England and North Wales, but not recorded from Ireland. *Fl. summer.*

XXIII. **SAMPHIRE.** CRITHMUM.

Leaves succulent, dissected. Umbels compound, with general and partial involucre. Petals entire. Fruit ovoid, not compressed, without distinct calycine teeth. Carpels of a thick, succulent or somewhat corky consistence, with 5 acute ribs, becoming prominent when dry, but not winged; the vittas numerous, slender, and irregular. Seeds loose in the cavity, with numerous fine vittas on the outside.

A single species, very different from any other British *Umbellate*, but closely allied to the large Mediterranean and Asiatic genus *Cachrys*, with which some botanists unite it.

1. **Sea Samphire.** *Crithmum maritimum*, Linn. (Fig. 426.)

(Eng. Bot. t. 819.)

A perfectly glabrous perennial, seldom above a foot high, almost woody at the base; the young branches, foliage, and umbels, thick and fleshy. Leaves twice or thrice ternate, with thick linear segments about an inch long. Umbels of 15 to 20 or even more rays. Involucre of several small linear or lanceolate bracts. Petals very minute, and soon disappearing. Fruits about 3 lines long.

In clefts of rocks, close to the sea, on the western coasts of Europe and northern Africa, and extending along the Mediterranean to the Black Sea. Abundant in southern and western England and southern Ireland, but becomes rare in northern England and Scotland. *Fl. summer.*

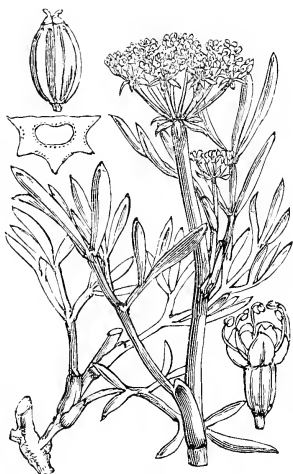


Fig. 426.

XXIV. **ANGELICA.** ANGELICA.

Leaves dissected. Umbels compound, with partial involucre of several bracts. Petals white, entire. Fruit flattened from front to back; the carpels broad, with 3 ribs on the back, the edges expanded into wings, those of the two carpels distinct before they separate, so that the fruit is surrounded by a double wing.

A genus of few species, dispersed over Europe, Asia, and North America, distinguished from all other British *Umbellates* by the double wing round the fruit.

1. **Wild Angelica.** *Angelica sylvestris*, Linn. (Fig. 427.)

(Eng. Bot. t. 1128.)

A tall, stout, branching perennial, attaining 3 or 4 feet in height, with thick stems, slightly downy in the upper part. Lower leaves large, twice pinnate, with ovate-lanceolate segments, often above 2 inches long, sharply toothed, and sometimes 3-lobed; the upper leaves shorter-stalked, with fewer segments, those under the peduncles often reduced to a broad sheath, with a few small segments at the top. Umbels large, terminal, those of the main stems often with 30 or 40 rays. General involucre of 2 or 3 linear bracts; partial ones of several fine, short bracts.



Fig. 427.

In moist woods, and marshy places, especially near streams, throughout Europe and Russian Asia to the Arctic regions. Abundant in Britain. *Fl. late in summer.*

The *garden Angelica* (*A. Archangelica*, Eng. Bot. t. 2561), a native of northern and eastern Europe, long cultivated for confectionery, is not wild in Britain.

XXV. PEUCEDAN. PEUCEDANUM.

Leaves dissected. Umbels compound, with partial involucre of many bracts. Petals white or yellowish, entire or notched, with an inflected point. Fruit flattened from front to back; the calycine teeth very small or indistinct. Carpels broad, with 3 prominent ribs on the back, the edges expanded into a wing, those of the two carpels so close as to form a single edge to the fruit before the carpels separate. Vittas single under the furrows.

A large genus, widely spread over Europe, Asia, and North America, scarcely differing from *Heracleum* except in the more evident ribs of the carpels, the more slender vittas, and generally in habit.

Segments of the leaves narrow oblong or linear.

Leaves several times ternate. Flowers yellowish 1. *Sea P.*

Leaves twice or three times pinnate. Flowers white 2. *Marsh P.*

Leaves of 3 broad segments, each 3 inches long, and often

3-lobed 3. *Broad P.*

The *Dillseed* (*Anethum graveolens*), often cultivated as a condiment, has the fruit of a *Peucedan* with the fine leaves of a *Fennel*.

1. *Sea Peucedan. Peucedanum officinale*, Linn. (Fig. 428.)

(Eng. Bot. t. 1767. *Hog's Fennel* or *Sulphur-weed*.)

A glabrous perennial, with erect, branching stems, 2 or even 3 feet

high. Leaves 3, 4, or 5 times ternate, with narrow-linear entire segments, often above 2 inches long. Umbels large, of 20 or more rays, with pale-yellow flowers. Bracts of the general involucre very few or wanting; those of the partial involucre very narrow and shorter than the pedicels. Fruit broadly oval, near 3 lines long.

In meadows and moist pastures, in central and eastern Europe and Russian Asia, or near the sea in western Europe. Scarce in Britain: forms of the *parsley* *Cenanth* or of the *meadow Silaus* have been frequently mistaken for it: and the only certain stations for the true *Peucedan* are the salt-marshes of Kent and Essex. *Fl. summer and autumn.*



Fig. 428.

2. Marsh Peucedan. *Peucedanum palustre*, Mœnch. (Fig. 429.)

(*Selinum*, Eng. Bot. t. 229. *Hog's Fennel* or *Milk Parsley*.)

Tall and erect like the last, but often hairy at the base, and the juice is milky. Leaves twice or thrice pinnate rather than ternate, with much shorter segments, varying from oblong to linear, and seldom exceeding half an inch. Umbels not so large as in the *sea P.*, although consisting of as many rays. Flowers white. Involucres, both general and partial, of several lanceolate or linear bracts, with fine points. Fruit broadly oval, about 2 lines long.

In wet meadows and marshes, in central, eastern, and northern Europe and Russian Asia, to the Arctic Circle. Apparently wanting in western France, although it extends into Spain. Like the *sea P.* very local in Britain and only known for certain in the marshes of eastern England from Suffolk to Yorkshire.



Fig. 429.

Fl. late in summer.

3. Broad Peucedan. *Peucedanum Ostruthium*, Koch.
(Fig. 430.)

(*Imperatoria*, Eng. Bot. t. 1380. *Masterwort*.)

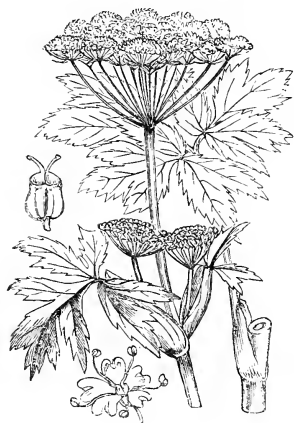


Fig. 430.

Stock perennial, with stout, erect stems, 2 to 3 feet high. Leaves divided into 3 large, broad segments, which are again deeply 3-lobed and coarsely toothed, 3 to 4 inches long, and often rather rough with a few short hairs, but much less so than in *Heracleum*; the lateral segments descend much lower along the leafstalk on the outer than on the inner side. Umbels large, terminal, of 40 to 50 rays, without any general involucre, and only a few very slender small bracts to the partial ones. Flowers white. Fruit nearly orbicular, about 2 lines diameter.

A native of mountain pastures in central Europe; formerly much cultivated as a pot-herb, and now naturalized in several parts of northern Europe as well as in the north of England and in Scotland. *Fl. early summer*.

XXVI. **PARSNIP.** *PASTINACA*.

Habit and fruit of *Heracleum*, but the flowers are yellow and all small. The vittas are also usually more slender, and descend lower down on the fruit, but this character is not constant.

A genus of very few species, chiefly from the Mediterranean region and west central Asia.

1. Common Parsnip. *Pastinaca sativa*, Linn. (Fig. 431.)
(Eng. Bot. t. 556.)

An annual or biennial, forming a taproot, with an erect stem seldom more than 2 feet high when wild, 3 or 4 when cultivated. Lower leaves pinnate, coarse, and more or less downy, especially on the under side, with 5, 7, or 9 segments, each 1 to 3 inches long, sharply toothed, and more or less lobed, especially the terminal one; upper leaves small

and less divided. Umbels not very large, of 8 to 12 rays, usually without involucre. Fruit about 3 lines long, flat and oval, with scarcely prominent ribs, the vittas very conspicuous, descending nearly to the base of the fruit.

In pastures and thickets, on banks and edges of fields, throughout central and southern Europe, and temperate Russian Asia. Frequent in England and Ireland, extending at least as far north as Durham. *Fl. summer.*

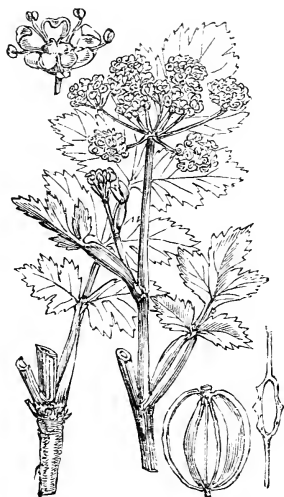


Fig. 431.

XXVII. **HERACLEUM.** HERACLEUM.

Coarse, rough herbs, the leaves dissected with large segments. Umbels compound; the bracts few and deciduous or none. Flowers white; the outer petals of each umbel larger. Fruit flattened from front to back, with a single thin border (splitting only by the separation of the carpels). Carpels broad, with 3 very fine, scarcely prominent ribs; or if 5, the 2 outside ones close to the border. Vittas single to each interstice, not descending to the base of the fruit, and often thickened at the lower end.

A rather natural genus, comprising a considerable number of species, from the mountains of central and southern Europe, and especially central Asia, with a single North American one. Some Asiatic species, remarkable for their size (the annual stems 12 to 15 feet, with umbels more than a foot in diameter), are occasionally grown in our gardens.

1. Common Heracleum. *Heracleum Sphondylium*, Linn. (Fig. 432.)

(Eng. Bot. t. 939. *Cow Parsnip* or *Hogweed*.)

A tall, coarse plant, although not quite so large nor so much branched as the *wild Angelica*, and the stock of much shorter duration,



Fig. 432.

but not strictly biennial as commonly supposed; the whole plant more or less rough with short, stiff hairs. Leaves pinnate, with 3, 5, or 7 large, broad segments, usually 3-lobed and toothed, from 3 to 5 inches long and at least as broad, sometimes more numerous and much narrower. Umbels large, of about 20 rays, the outer petals much larger than the others. Carpels nearly orbicular, 3 or 4 lines long; the vittas very conspicuous, often only reaching half-way down the fruit.

In meadows, pastures, hedges, and thickets, throughout Europe and Russian Asia. In Britain, one of the commonest of our *Umbellates*. *Fl. summer and autumn.*

XXVIII. **HARTWORT.** *TORDYLIUM.*

Leaves dissected. Umbels compound, with general and partial involucre. Flowers white or pink, the outer petals often larger. Fruits flattened from front to back, with a single thick border (splitting only by the separation of the carpels), and covered with stiff hairs or tubercles. Carpels broad, with the ribs scarcely visible, and 1 or 3 vittas under the interstices.

A small genus, chiefly from the Mediterranean region, with the appearance of *Caucalis*, but readily known by the flat fruit.

1. Great Hartwort. *Tordylium maximum*, Linn. (Fig. 433.)

(Eng. Bot. t. 1173.)

An erect annual, 2 feet or rather more in height, rough with short, stiff hairs. Leaves pinnate, with 5, 7, or 9 segments, lanceolate or almost ovate, and coarsely toothed; the lateral ones 1 to 2 inches, the terminal ones usually longer. Umbels terminal, of 8 to 10 short rays, with a few rather long, narrow bracts to the involucre. Petals all

small and pink. Fruits about 3 lines long, the thickened border very prominent.

In waste and cultivated lands, in southern Europe, and eastward to the Caucasus; more rare as a weed of cultivation in central Europe. In Britain, only in Middlesex and some adjoining counties. *Fl. summer.*



Fig. 433.

XXIX. **SCANDIX.** SCANDIX.

Leaves dissected. Umbels compound, with partial involucre of several bracts, and white flowers. Fruit linear, with a very long, smooth beak. Carpels (below the beak) with 5 obtuse ribs, without vittas. Albumen of the seed with a longitudinal furrow on the inner face.

A small but distinct genus, ranging chiefly over the Mediterranean region and west central Asia.

1. **Needle Scandix.** *Scandix Pecten*, Linn. (Fig. 434.)

(Eng. Bot. t. 1397. *Shepherd's-needle* or *Venus's-comb*.)

A branching annual, erect or spreading, 6 inches to a foot high, and more or less hairy. Leaves twice or thrice pinnate, with short segments cut into narrow lobes. Umbels terminal, of 2 or 3 rays, without general involucre; partial involucre of several lanceolate bracts, often 2- or 3-lobed at the top. Flowers almost sessile, small and white, with a few large outer petals. Fruits attaining near 2 inches; the carpels at the base cylindrical and ribbed, 4 or 5 lines long, the

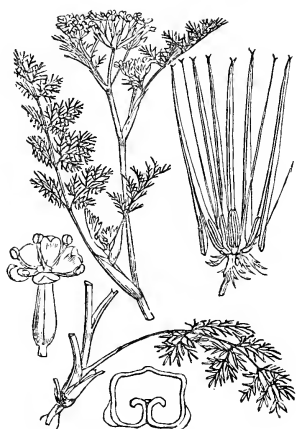


Fig. 434.

remainder occupied by a stiff, flattened beak, often compared to the tooth of a comb.

In fields and waste places, throughout Europe and west central Asia. Frequent as a cornfield weed in England, Ireland, and the south of Scotland, but decreasing further northward. *Fl. with the corn.*

XXX. **CICELY.** MYRRHIS.

Leaves dissected. Umbels compound, with partial involucre of several bracts, and white flowers. Fruit narrow-oblong, not beaked. Carpels with 5 very prominent, acute ribs, which are hollow inside, and no vittas. Albumen of the seed with a deep longitudinal furrow on the inner face.

A single species, scarcely distinct as a genus from *Chervil*.

1. **Sweet Cicely.** *Myrrhis odorata*, Scop. (Fig. 435.)

(*Scandix*, Eng. Bot. t. 697.)

An erect, branching, hairy perennial, 2 to 3 feet high, with the foliage and habit of a *Chervil*, and highly aromatic. Leaves large, thin, twice or three times pinnate, with numerous lanceolate segments, deeply pinnatifid and toothed. Umbels terminal, not large, with seldom more than 8 or 10 rays, and of these but few ripen their fruits. No general involucre; bracts of the partial ones lanceolate, thin, whitish, with fine points. Fruits when ripe 6 or 7 lines to near an inch long; the very prominent ribs occasionally rough with minute hairs.

A native of mountain pastures, in central and southern Europe, from the Pyrenees to the Caucasus. Of ancient cultivation in more

northern Europe, it has frequently established itself in the neighbourhood of cottages. In Britain, believed by some to be truly indigenous in the hilly districts of northern England, where, at any rate, it is perfectly naturalized. *Fl. spring and early summer.*



Fig. 435.

XXXI. **BUNIAM.** BUNIAM.

Leaves dissected. Umbels compound, either without involucre or with very few small bracts, and white flowers. Fruit oval-oblong, somewhat laterally compressed, shortly contracted at the top, with erect or slightly spreading styles. Carpels with 5 scarcely perceptible ribs, and several very slender vittas under the interstices. Albumen of the seed with a longitudinal furrow on the inner face.

A genus of few species, chiefly from the Mediterranean region, with the habit of the tuberous *Carums*, but with a fruit more nearly allied to that of some *Chervils*, although shorter.

1. Tuberous *Buniam*. *Buniam flexuosum*, With. (Fig. 436.)

(Eng. Bot. t. 988.)

The perennial stock consists of a globular tuber, known by the name of *Earthnut* or *Pignut*; the annual stems erect, slender, glabrous, 1 to near 2 feet high, with a few forked branches. Radical leaves few and decaying early, with 3 long-stalked segments, each once or twice pinnate; the ultimate divisions short, narrow, pointed, entire or 3-lobed. Stem-leaves few, with narrow linear divisions; the central



Fig. 436.

lobe of each segment much longer than the lateral ones. Umbels terminal, or one opposite the last leaf, of 6 to 10 rays. The ribs and vittas of the fruit scarcely perceptible.

In woods and pastures, chiefly known as a west European plant, possibly extending eastward to the Caucasus, but there is some uncertainty as to the identity of the eastern species referred to it. Much more common in Britain than the *tuberosus Carum*, which is also known under the name of *Pignut*. *Fl. summer*.

XXXII. CHERVIL. CHÆROPHYLLUM.

Leaves dissected. Umbels compound, with partial involucre of several bracts, and white flowers. Fruit narrow-oblong or linear, contracted at the top, and sometimes forming a beak always much shorter than the seed. Carpels with 5 ribs, sometimes only apparent at the top, either without vittas or with one vitta under each interstice. Seed marked with a longitudinal furrow on the inner face.

A considerable and rather natural genus, widely diffused over the northern hemisphere without the tropics. It is usually divided into two, *Cherophyllum*, with a vitta between each rib; and *Anthriscus*, without vittas, and the ribs themselves scarcely visible, except at the top, when the fruit is beaked; but the distinction is purely artificial.

Umbels on short, lateral peduncles. Fruit short, hispid . . . 3. *Burr C.*
Umbels terminal. Fruit long, glabrous.

Lobes of the leaves rather obtuse. Ribs and vittas of the fruit
conspicuous when dry 1. *Rough C.*

Lobes of the leaves pointed. Fruit very smooth, without ribs
or vittas 2. *Wild C.*

The garden Chervil (*C. sativum*, Eng. Bot. t. 1268; *Anthriscus Cerefolium*, Brit. Fl.), a native of south-eastern Europe, may occa-

sionally be found in waste places near where it has been cultivated. It is a more slender plant than the *wild C.*, the leaves more dissected, with shorter segments, the umbels mostly lateral and sessile, and the fruit evidently beaked.

1. **Rough Chervil.** *Chærophyllum temulum*, Linn.

(Fig. 437.)

(Eng. Bot. t. 1521.)

An erect biennial, 2 to 3 feet high, and rough with short reflexed hairs. Leaves twice pinnate or ternate, with ovate or wedge-shaped, pinnatifid or toothed segments, more or less hairy, especially on the upper side; the lobes short and rather obtuse, never elongated and pointed as in the *wild C.* and the *sweet Cicely*. Umbels of few rays, without a general involucre; the partial involucre of 5 or 6 broadly-lanceolate bracts, shorter than the pedicels. Outer petals of the umbel rather large. Fruit the size of that of the *wild C.*, but with 5 obtuse ribs and vittas between them.

In hedges and thickets, in central and southern Europe, and all across Russian Asia, extending northwards into southern Scandinavia. Frequent in England and Ireland, less so in the Scotch Highlands. *Fl. summer.*

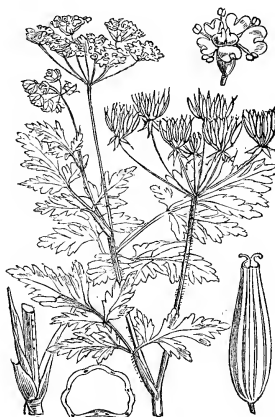


Fig. 437.

2. **Wild Chervil.** *Chærophyllum sylvestre*, Linn.

(Fig. 438.)

(Eng. Bot. t. 752. *Anthriscus*, Brit. Fl.)

The perennial, or perhaps only biennial, stock descends into a tap-root. Stems hairy, erect, and branched, 2 to 3 feet high. Lower leaves on long stalks, twice pinnate, with ovate-lanceolate pointed segments, deeply pinnatifid and toothed; upper leaves smaller, on shorter stalks, all more or less hairy, or rarely nearly glabrous. Umbels rather numerous, not large, of 8 to 10 rays, with small white flowers. No gene-



Fig. 438.

ral involucre, but the partial ones of several bracts. Fruits about 3 lines long, very smooth and shining, without ribs or vittas, narrowed at the top, but without any distinct beak.

Under hedges, on the borders of fields, etc., throughout Europe and Russian Asia. In Britain, one of the commonest *Umbellates*. *Fl. spring*.

3. Burr Chervil. *Chærophyllum Anthriscus*, Lam.

(Fig. 439.)

(*Scandix*, Eng. Bot. t. 818. *Anthriscus vulgaris*, Brit. Fl.)

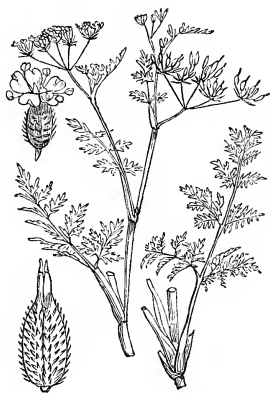


Fig. 439.

An erect, branched, hairy annual, attaining near 2 feet in height, with nearly as much the habit of a *Caucalis* as of a *Chervil*. Leaves not large, twice, or the lower ones thrice pinnate, with ovate or ovate-lanceolate segments, pinnately lobed and toothed. Umbels small, on short peduncles, opposite to the leaves, of 3 to 7 rays, without general involucre, and but few bracts to the partial ones. Fruits ovoid-oblong, not 2 lines long, covered with short, hooked bristles, and narrowed at the top into a very short, smooth beak.

A weed of cultivation, probably of south European origin, but readily spreading with our crops, and now established in scattered localities over Europe and Russian Asia. Rather

frequent in England and Ireland, more scarce in Scotland. *Fl. spring and early summer.*

XXXIII. CAUCALIS. CAUCALIS.

Hairy annuals, with dissected leaves. Umbels usually compound, with partial involucre of several simple bracts, or rarely wanting. Outer petals usually larger, and deeply bifid. Fruit ovoid, covered with prickles or bristles. Carpels with 3 or 7 dorsal ribs, and 2 on the inner face; vittas single under each furrow. Albumen more or less furrowed on the inner face.

A small European, Asiatic, and African genus, one of the few natural ones in the family, if retained entire. It is well distinguished from *Carrot* by the involucre, the shape of the fruit, and of the albumen; from the bristle-fruited *Chervils* by the want of the smooth tip to the fruit; from all other British compound *Umbellates* by the bristled fruits.

Umbels opposite to the leaves, sessile, or on peduncles shorter than the rays.

Umbels contracted into little sessile heads. Fruit short . 1. *Knotted C.*

Umbels of 3 or 4 slender rays. Fruit oblong, with a short beak *Burr Chervil.*

Umbels terminal, or on peduncles longer than the rays.

Fruit not 2 lines long, with short bristles, mostly hooked.

General involucre of several bracts (often very small), one under each of the outer rays 2. *Upright C.*

General involucre of a single bract or entirely wanting . 3. *Spreading C.*

Fruit 3 or 4 lines long or more, with long prickles.

Leaves twice or thrice pinnate, with much cut, short segments 4. *Small C.*

Leaves once pinnate, with long pinnatifid segments . 5. *Broad C.*

1. *Knotted Caulalis. Caulalis nodosa*, Sm. (Fig. 440.)

(Eng. Bot. t. 199. *Torilis*, Brit. Fl.)

Stems procumbent or spreading, scarcely a foot long. Leaves twice pinnate, with small, narrow, pointed segments. Umbels forming little heads, closely sessile, and opposite to the leaves; they are sometimes composed of 2 or 3 exceedingly short, scarcely distinct rays, sometimes of a simple cluster. Fruits smaller than in the other species; the outer ones covered with short, straight or hooked bristles, which on the inner ones are reduced to mere tubercles.



Fig. 440.

On roadsides and in waste places, in the limestone districts of central and southern Europe, and eastward to the Caucasus, extending northward chiefly as a weed of cultivation. Common in sunny places in southern England and Ireland, more rare in the north and in southern Scotland. *Fl. spring and summer.*

2. Upright Caulis. *Caucalis Anthriscus*, Huds. (Fig. 441.)

(Eng. Bot. t. 987. *Torilis*, Brit. Fl. *Hedge Parsley*.)



Fig. 441.

Stem erect, attaining 2 or even 3 feet, with slender, wiry branches, sprinkled, as well as the leaves, with appressed, stiff hairs. Leaves once, or the lower ones twice pinnate; the segments lanceolate, pinnatifid, or coarsely toothed; the lower ones of each leaf stalked, and remote from the others. Umbels on long, slender peduncles, rather small, of from 3 to 7 or 8 rays. Involucres, both general and partial, of small, subulate bracts, one close under each ray and often not readily distinguished at first sight. Petals pink or white, not very unequal in size. Fruit a small burr, being covered with short, rough bristles, more or less curved inwards, or hooked at the top.

In hedges, on roadsides, and waste places, common throughout Europe and central and Russian Asia, except the extreme north. Abundant all over Britain. *Fl. summer and autumn.*

3. Spreading *Caucalis*. *Caucalis infesta*, Curt. (Fig. 442.)

(Eng. Bot. 1314. *Torilis*, Brit. Fl.)

Very near the *upright C.*, but usually a rather smaller and more spreading plant; the general involucre is either entirely wanting or reduced to a single bract, often lanceolate, and the bristles of the fruit are usually less curved, but with a minute hook at the top; this character is not however so constant as that of the involucre.

In cultivated and waste places, on banks and roadsides, in central and southern Europe to the Caucasus, not extending into Scandinavia. In Britain, chiefly amongst corn, in the southern and eastern counties of England. It is said to be abundant in several local Floras, but the *upright C.* is often mistaken for it. *Fl. summer and autumn.*



Fig. 442.

4. Small *Caucalis*. *Caucalis daucoides*, Linn. (Fig. 443.)

(Eng. Bot. t. 197.)

Erect or spreading, and much branched, seldom above a foot high. Leaves twice or three times pinnate, with rather narrow, but short, pinnatifid segments, the general outline of the leaf being broadly triangular. Umbels terminal or opposed to the leaf, on rather long peduncles, usually of 3 or 4 rays only. General involucre of one bract, partial ones of a few linear bracts. Flowers white or pink, the outer petals occasionally larger. Fruits nearly sessile, attaining, when ripe, nearly half an inch, covered with long, stout prickles. There are usually in each partial umbel a few barren flowers on longer pedicels.

A cornfield weed of southern origin, now widely spread over Europe and Russian Asia. Apparently well established in some of the southern counties of England. *Fl. with the corn.*

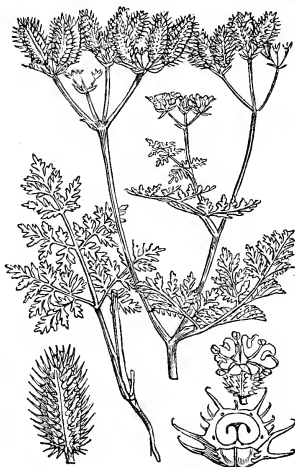


Fig. 443.

5. Broad *Caucalis*. *Caucalis latifolia*, Linn. (Fig. 444.)

(Eng. Bot. t. 198.)



Fig. 444.

Stem seldom a foot high, erect or spreading, and branched at the base. Leaves much less divided than in the other species, being simply pinnate, with oblong-lanceolate segments, the lowest above an inch long, and pinnatifid, the others gradually diminishing to the top, and less deeply cut. Umbels terminal or opposite the leaves, on stout peduncles, consisting of 2 or more rays. Involucres, both general and partial, of broad, thin bracts. Flowers white or purple, the outer petals large. Fruit 4 or 5 lines long, the primary and secondary ribs equally prominent, with long, straight or hooked prickles.

In fields and waste places, in southern Europe and west-central Asia, often establishing itself for a time in more

northern localities. Occasionally found as a cornfield weed in several counties of England. *Fl. with the corn.*

XXXIV. **CARROT.** DAUCUS.

Leaves dissected. Umbels compound, with general and partial involucres of several linear, pinnatifid or divided bracts. Fruit ovoid, prickly on the ribs, the 4 secondary ribs more prominent than the 3 primary dorsal ones. Albumen not furrowed.

A genus of very few real species, although the published forms are now numerous; they are widely spread over most cultivated or maritime parts of the globe.

1. Common Carrot. *Daucus Carota*, Linn. (Fig. 445.)

(Eng. Bot. t. 1174.)

An erect annual or biennial, 1 to 3 feet high, with a taproot. Lower leaves twice or thrice pinnate, with deeply 3-lobed or pinnatifid seg-

ments, usually lanceolate or linear, sometimes short and crenate; upper leaves with fewer and narrower divisions. Umbels terminal, rather large, with numerous crowded rays; the inner ones very short, the outer much longer, and usually closing over after flowering, so as to give a concave or globular form to the umbel, with the fruit inside. Bracts of both involucre usually divided into 3 or 5 long linear lobes. Fruit covered with prickles, of which the larger ones are often much flattened at the base.

Probably an original native of the seacoasts of southern Europe, but of very ancient cultivation, and sows itself most readily, soon degenerating to the wild form with a slender root, and now most abundant in fields, pastures, waste places, etc., throughout Europe and Russian Asia. Common in Britain, especially near the sea. *Fl. the whole summer and autumn.* A decidedly maritime variety, with the leaves somewhat fleshy, with shorter segments, more or less thickened peduncles, more spreading umbels, and more flattened prickles to the fruits, is often considered as a distinct species (*D. maritimus*, Eng. Bot. t. 2560.)

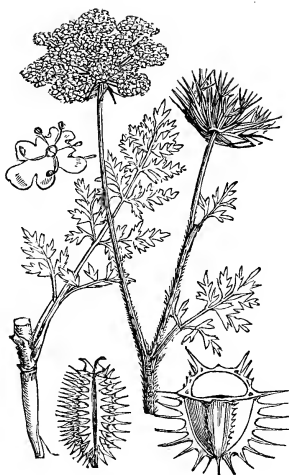


Fig. 445.

XXXV. HEMLOCK. CONIUM.

Leaves dissected. Umbels compound, with general and partial involucre and small white flowers. Fruit broadly ovate, somewhat laterally compressed, without distinct calycine teeth. Carpels with 5 prominent ribs, which when ripe are often slightly waved or crenated. No vittas. Albumen with a deep longitudinal furrow on the inner face.

A single species, with the short fruit of an *Apium* or *Cowbane*, but differing essentially in the deeply furrowed albumen.

1. Common Hemlock. *Conium maculatum*, Linn. (Fig. 446.)

(Eng. Bot. t. 1191.)

An erect, branching annual or biennial, 3 to 5 feet high or sometimes more, usually glabrous, and emitting a nauseous smell when



Fig. 446.

bruised. Leaves large and much divided into numerous small ovate or lanceolate deeply-cut segments; the upper leaves gradually smaller and less divided. Umbels terminal, not large for the size of the plant, of 10, 12, or even 15 rays. Bracts short and lanceolate; those of the general involucre variable in number; those of the partial ones almost always 3, turned to the outside of the umbel. Fruit about 2 lines long.

On the banks of streams, along hedges, and the borders of fields, etc., widely spread over Europe and temperate Asia, though not always common. Generally distributed over Britain. *Fl. summer.*

XXXVI. **PHYSOSPERM.** PHYSOSPERMUM.

Leaves dissected. Umbels compound, with general and partial involucre. Flowers white. Fruit 2-lobed, the carpels nearly globular, and attached by a narrow edge, each with 5 scarcely visible rays, and single vittas to the interstices. Albumen with a longitudinal furrow on the inner face.

A genus of very few species, from Europe and temperate Asia.

1. Cornish Physosperm. *Physospermum cornubiense*, DC. (Fig. 447.)

(*Ligusticum.* Eng. Bot. t. 683.)

Stock perennial. Stem erect, almost leafless, $1\frac{1}{2}$ to 2 feet high, slightly branched. Radical leaves on long stalks, twice or thrice ternate; the segments ovate or cuneate, and deeply cut. Umbels terminal, of 10 to 12 rays, with rather large, white flowers. Involucre, both general and partial, of very few linear bracts. The fruits have the appearance of two little smooth bladders, placed face to face, with a loose seed in each.

A mountain plant, occurring here and there along the great European chain from the Asturias to the Caucasus, and reappearing in a few very limited localities in Cornwall and Devonshire. *Fl. late in summer*. The Continental plant is by some botanists considered as a distinct species from the British one, but the characters appear to have been derived from the examination of single specimens.



Fig. 447.

XXXVII. **SMYRNIUM.** SMYRNIUM.

Leaves entire or dissected. Umbels compound, either without involucres or only a very few small bracts. Flowers yellow. Fruit 2-lobed; the carpels ovoid, attached by the very narrow face, each with 3 prominent, angular ribs, and several vittas under the interstices. Albumen with a longitudinal furrow on the inner face.

A. genus of very few species, from the Mediterranean region and western Asia.

1. **Common Smyrnium.** *Smyrnium Olusatrum*, Linn.

(Fig. 448.)

(Eng. Bot. t. 230. *Alexanders*.)

A coarse, erect annual or biennial, 2 to 4 feet high, and nearly glabrous. Lower leaves twice or thrice, upper ones but once ternate; the segments broadly ovate, coarsely toothed or 3-lobed, 2 or more inches long and broad, and often of a yellowish-green. Umbels terminal, of 8 to 12 rays. Flowers of a greenish yellow, much crowded in the partial umbels. As the fruit ripens, the peduncles are often much thickened under the umbels. Carpels above 3 lines long, very angular.



Fig. 448.

In meadows and waste places, especially near the sea, all round the Mediterranean and up western Europe to the English Channel. Probably really indigenous in several of the maritime counties of southern England and Ireland, and, having been formerly much cultivated, has spread into many inland parts of England and southern Scotland, in the vicinity of old castles and gardens. *Fl. spring and early summer.*

XXXVIII. **CORIANDER.** CORIANDRUM.

Fruit globular, not readily separating into the two carpels, crowned by the conspicuous teeth of the calyx, the ribs scarcely prominent, and no vittas.

A single species, very distinct in the form of the fruit.

1. **Common Coriander.** *Coriandrum sativum*, Linn.

(Fig. 449.)

(Eng. Bot. t. 67.)

An erect, branching, glabrous annual, 1 to 1½ feet high, emitting a very disagreeable smell when rubbed. Lowest leaves once or twice pinnate, with broadly-ovate or cuneate, deeply-cut segments; the others more divided, with linear segments, few and slender in the uppermost leaves. Umbels terminal, rather small, of 5 to 8 rays, without general involucre, and only a few small slender bracts to the partial ones.

Flowers white, the outer petals larger.
Fruits about 2 lines long.

A native of the Levant, long since cultivated in Europe, and occasionally spreading as a weed of cultivation. Said to be established as such in some of the eastern counties of England. *Fl. summer.*



Fig. 449.

XXXIII. THE ARALIA FAMILY. ARALIACEÆ.

Shrubs, trees, or climbers, rarely herbs, differing from most *Umbellates* in their simple (solitary or paniculate) umbels, and more generally in their fruit more or less succulent, consisting often of more than 2 (from 2 to 10) carpels, which do not separate so readily as in *Umbellates*, usually forming a single berry. The styles also are sometimes united.

A considerable Order, widely spread over the warmer regions of the globe, represented in Europe by a single species. Some species of *Aralia* are also occasionally cultivated in gardens.

I. **IVY.** HEDERA.

Petals not cohering at the top. Cells of the ovary 5 or 10. Styles short, usually cohering in a single mass.

A genus extending nearly over the whole range of the Order, but whose precise distinctive characters, and consequently the number of species it should contain, are as yet very imperfectly settled.

Common Ivy. *Hedera Helix*, Linn. (Fig. 450.)

(Eng. Bot. t. 1267.)



Fig. 450.

A woody, evergreen climber; when wild the lower, slender branches spread along the ground, with small leaves, whilst the main stems climb up trees, rocks, or buildings to a great height, adhering by means of small, rootlike excrescences. Leaves thick and shining, ovate, angular, or 3- or 5-lobed; those of the barren stems usually much more divided than the upper ones. Flowering branches bushy, projecting a foot or two from the climbing stems, each bearing a short raceme or panicle of nearly globose umbels. Flowers of a yellowish green. Border of the calyx entire, scarcely prominent, about halfway up the ovary. Petals 5, broad and short. Stamens 5. Styles united into a single, very short one. Berry smooth and black, with from 2 to 5 seeds.

In woods, on rocks and old buildings, common in western and southern Europe, northern Africa, and west-central Asia, scarcely penetrating into central Europe, except where the winters are very mild. Extends over the whole of Britain. *Fl. late in autumn.* Several varieties are in cultivation, differing chiefly in the more or less divided leaves, and one, with yellow berries, introduced from the Continent, has become almost wild in some parts of southern and western England.

XXXIV. MISTLETOE FAMILY. LORANTHACEÆ.

Shrubby or half-succulent evergreens, parasitic on the branches of trees, with jointed branches, opposite thickish leaves, and no stipules. Calyx combined with the ovary, either entirely so or appearing only in the shape of an entire or toothed border round its summit. Petals 4. Stamens 4, opposite the petals, and usually inserted on them (or, in a few exotic species, the petals

are wanting, and the stamens reduced to 3, 2, or 1). Ovary 1-celled, with a simple style or stigma. Fruit a 1-seeded berry.

A considerable tropical family, with but very few representatives in the more temperate regions, and no exotic species are at present in cultivation. The affinities of the Order are perhaps greater with the *Santalwood* family among *Monochlamyds* than with the *Calyciflores*, with which they are here associated; but they could not well be removed thither without doing violence to the general principles of the Candollean arrangement.

I. MISTLETOE. VISCUM.

Flowers dioecious. Calyx without any prominent border. Anthers in the males sessile in the centre of the petals, opening in several pores. Stigma in the females sessile on the ovary.

The genus, taken in its most extended sense, included a considerable number of species, ranging over nearly the whole area of the family, but is now limited to a much smaller number, chiefly Asiatic, besides the common European one.

1. Common Mistletoe. *Viscum album*, Linn. (Fig. 451.)

(Eng. Bot. t. 1470.)

Stems becoming woody when old, with repeatedly forked, succulent branches, forming dense tufts of a yellowish green, attaining 1 to 2 feet in diameter, and attached by a thickened base to the branches of trees. Leaves entire, varying from narrow-oblong to nearly obovate, thick and fleshy, and always obtuse. Flowers almost sessile in the forks of the branches; the males 3 to 5 together, in a somewhat cup-shaped, fleshy bract, with 4 short, thick, triangular petals; the females solitary, or rarely 2 or 3 together in a cup-shaped bract. The petals very minute. Berry white, semi-transparent, enclosing a single seed, surrounded by a very glutinous pulp.

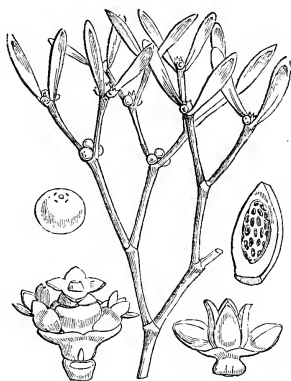


Fig. 451.

On a great variety of trees, but especially on the *Apple*, extending over the whole of temperate Europe, from Sweden to the Mediterranean, and far into Asia, but not everywhere abundant. Common in southern and especially western England; rare in the north, and not known in Scotland or Ireland. *Fl. spring.*

XXXV. THE CORNEL FAMILY. CORNACEÆ.

Limited in Europe to the single genus *Cornel*, with which are associated two or three allied tropical genera, scarcely differing from the *Aralia* family, except in their erect, not climbing habit, the more generally opposite leaves, and the more complete union of the carpels and styles.

Among the exotic genera cultivated in our gardens may be mentioned the Japanese *Aucuba* (of which however we only possess the female) and the *Benthamia fragifera* from the Himalaya.

I. CORNEL. CORNUS.

Tree, shrubs, or very rarely herbs, with opposite (or in one exotic species alternate), undivided leaves, and rather small flowers in terminal corymbs without bracts, or in umbels or heads surrounded by bracts, which are sometimes coloured and petal-like. Calyx, 4 small teeth round the summit of the ovary. Petals 4, valvate in the bud. Stamens 4, alternating with the petals. Style simple. Ovary 2-celled, with a single pendulous ovule in each cell. Fruit a berry-like drupe; the stone 1- or 2-celled, with 1 seed in each cell. Seeds with a fleshy albumen and a rather long embryo.

A genus not numerous in species, but extending over the temperate and colder regions of the northern hemisphere, both in the new and the old world. It was formerly included in the *Honeysuckle* family, from which it differs chiefly in the distinct petals, valvular in the bud. Low herb. Umbel surrounded by 4 petal-like bracts . . . 1. *Dwarf C.*
Shrub. Flowers in a corymb, with bracts 2. *Common C.*

Some other shrubby species of *Cornel* are often planted in our shrubberies, especially *C. alba*, *alternifolia*, and *florida*, from North America, and *C. mas* from southern Europe.

1. Dwarf Cornel. *Cornus suecica*, Linn. (Fig. 452.)

(Eng. Bot. t. 310.)

Unlike as this little herb is to the *common C.*, its generic affinity may be

traced through the exotic *C. florida*. It has a slender, creeping perennial root-stock, with annual stems, barely 6 inches high, and usually simple. Leaves sessile, ovate, entire, seldom above an inch long, with 5 or sometimes 7 longitudinal nerves, and sprinkled with a few very minute, closely appressed hairs. Flowers very small, in a little terminal umbel, surrounded by 4 large, broad, petal-like, white bracts, so as to give the whole umbel the appearance of a single flower with 4 petals. The real petals are very minute, of a dark purple. Drupes small and red, resembling berries.

In mountain pastures, in northern Europe, extending into the Arctic Circle nearly all round the globe. Abundant in Scandinavia, and descending southward to northern Germany. Not uncommon in the Scotch Highlands, reappearing in north-eastern England, but not in Ireland. *Fl. summer, rather late.*

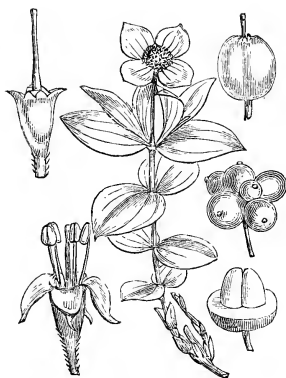


Fig. 452.

2. Common Cornel. *Cornus sanguinea*, Linn. (Fig. 453.)

(Eng. Bot. t. 249. *Dogwood*.)

An erect shrub, of 5 or 6 feet. Leaves opposite, broadly ovate, and stalked; when young, hoary or silky, with closely appressed hairs; but when full-grown, green and nearly glabrous. Flowers numerous, forming terminal cymes of $1\frac{1}{2}$ to 2 inches in diameter, without bracts; the calyx and peduncles covered with mealy down. Petals of a dull white, lanceolate, nearly 3 lines long. Drupes globular, almost black, and very bitter.

In hedges and thickets, in temperate Europe and Russian Asia, extending northwards into southern Scandinavia. Abundant in southern England, becoming scarce in the north, and does not appear to be wild anywhere in Scotland, and only in a very few localities in Ireland. *Fl. early summer.*



Fig. 453.

XXXVI. THE HONEYSUCKLE FAMILY. CAPRIFOLIACEÆ.

Trees, shrubs, or herbs, with opposite leaves, and no stipules. Flowers usually in terminal heads, corymbs, or panicles, more rarely axillary. Calyx combined with the ovary, with an entire or toothed border, sometimes scarcely prominent. Corolla monopetalous, 5- or rarely 4-lobed, regular or somewhat irregular, with the lobes overlapping each other in the bud. Stamens inserted in the tube of the corolla, and alternating with its lobes, either of the same number or one less, or rarely double the number. Ovary inferior, with 3 to 5 cells, and as many stigmas, either sessile or borne on short styles, or united on the summit of a single style. Fruit usually succulent, with 1 to 5 cells. Seeds solitary or few in each cell, with a fleshy albumen.

The *Honeysuckle* family is not a very natural one, but tolerably well defined, differing from the exotic opposite-leaved genera of the *Madder* family chiefly in the want of real stipules; from the *Valerian* and *Teasel* families in the compound ovary.

Stigmas several. Corolla spreading, with a very short tube.

Low herb. Leaves once, twice, or thrice ternate . . . 1. MOSCATEL.

Tall herb, or tree. Leaves pinnate 2. ELDER.

Shrubs. Leaves entire or palmately lobed 3. VIBURNUM.

Style single. Corolla narrowed into a tube at the base.

Shrubs or climbers. Stamens 5 4. HONEYSUCKLE.

Trailing perennial. Stamens 4 5. LINNÆA.

The *Snowberry* (*Symphoricarpos*), *Leycesteria*, and *Weigela*, of our gardens, belong also to this family.

I. MOSCATEL. ADOXA.

Leaves ternately divided. Calyx with 2 or 3 spreading teeth or lobes. Corolla with a very short tube, and 4 or 5 spreading divisions. Stamens 8 or 10, in pairs, alternating with the divisions of the corolla, and inserted on a little ring at its base. Styles 3 to 5, very short, united at the base. Ovary 3- to 5-celled, with one ovule in each cell. Fruit a berry.

A genus consisting of a single species, with very different foliage and stamens from those of other *Caprifoliaceæ*, but in other respects much more nearly allied to them than to the *Aralia* family, among which it has until recently been classed.

1. **Tuberous Moscatel.** *Adoxa Moschatellina*, Linn.

(Fig. 454.)

(Eng. Bot. t. 453.)

A low, glabrous herb, of a light-green colour in all its parts; the rootstock covered with a few thick scales the remains of old leafstalks, and emitting creeping, half-underground runners. Radical leaves stalked, once, twice, or even three times ternate, with broad, deeply 3-lobed segments. Flower-stems radical, from 4 to 6 inches high, with a single pair of leaves on short stalks, and but once ternate. Flowers pale-green, in a little globular head at the top of the stem, containing usually 5; the terminal one with 2 divisions to the calyx, and 4 to the corolla, and 8 stamens; whilst the 4 lateral flowers have 3 divisions to the calyx, and 5 to the corolla, with 10 stamens; but these numbers are not quite constant. Berry green and fleshy, most frequently containing but a single seed.



Fig. 454.

On moist, shady banks, in woods and other shady places, especially in hilly districts, in northern and central Europe, Russian Asia, and a part of North America, extending far into the Arctic regions, and ascending to the highest alpine summits. In southern Europe, chiefly confined to mountains. Common in Britain. *Fl. spring.*

II. **ELDER.** *SAMBUCUS.*

Trees, shrubs, or tall herbs, with opposite pinnate leaves, and large cymes or corymbs of numerous, rather small, white flowers. Calyx with a border of 5 small teeth. Corolla with a very short tube, and 5 spreading divisions, so as to appear rotate. Stamens 5, inserted at the base of the corolla. Stigma sessile, 3- to 5-lobed. Fruit a berry, or, strictly speaking, a berry-like drupe, with 3, rarely 4, seed-like stones, each containing a single seed.

The genus consists of but few species, spread over Europe, temperate Asia, and North America, and is the only one in the family with pinnate leaves.

Tree. Leaflets ovate, without stipular lobes 1. *Common E.*

Herb. Leaflets lanceolate, the lowest short, broad, and close

to the stem, representing stipules 2. *Dwarf E.*

The *red-berried E. (S. racemosus)* common in our shrubberies, is a native of the mountains of continental Europe.

1. Common Elder. *Sambucus nigra*, Linn. (Fig. 455.)

(Eng. Bot. t. 476.)



Fig. 455.

A small tree, or shrub, with the stem and branches full of pith. Leaf-segments 5 to 7, ovate, pointed, 2 to 3 inches long, regularly and sharply toothed, and nearly glabrous. Corymbs 5 or 6 inches broad, several times branched, the first time into 4 or 5, but the branches less numerous at each subsequent division, the bracts very minute. Flowers white or cream-coloured. Fruits black.

In woods, coppices, and waste places, common in central and southern Europe to the Caucasus, and extending itself readily from cultivation further northward. Appears to be truly indigenous in England and Ireland, but only introduced into Scotland. *Fl. summer, rather*

early. A garden variety has deeply and finely-cut segments to the leaves.

2. Dwarf Elder. *Sambucus Ebulus*, Linn. (Fig. 456.)

(Eng. Bot. t. 475. *Danewort.*)

Stock short and perennial, with annual, erect stems, thick and pithy, slightly branched, 2 to 3 feet high. Leaf-segments 7 to 11, lanceolate, 2 to 4 inches long, with a small one on each side of the leafstalk, on the stem itself, looking like stipules. Corymbs less regular, and rather smaller than in the *common E.*, with only 3 primary branches. Flowers sweet-scented, of a pure white, or tinted with purple on the outside. Fruits black.

On roadsides, in rubbishy wastes, and stony places, in central and southern Europe, and west central Asia, extending northward to southern Sweden. Occurs in several parts of Britain, and may be really indigenous in some of the southern counties of England and Ireland, although it is believed by many to be even there an introduced plant. *Fl. summer, later than the common E.*



Fig. 456.

III. **VIBURNUM.** VIBURNUM.

Shrubs or small trees, with undivided or palmately-lobed leaves and whitish flowers in terminal cymes. Calyx with a border of 5 small teeth. Corolla with a short campanulate tube (in some exotic species much longer) and 5 spreading divisions. Stamens 5, inserted near the base of the corolla. Stigmas 3 or 2, sessile or on very short styles. Ovary 3- or 2-celled in a very young stage, but at the time of flowering 1-celled, with a single ovule. Fruit a 1-seeded berry.

A rather large and widely-spread genus, extending further into the tropical regions of both the new and the old world than any other of the family. The flowers, at first sight very much like those of the *Elder*, have yet a more distinct tube, and the foliage is very different.

Leaves toothed, undivided, downy underneath. Flowers

all small and perfect 1. *Mealy V.*

Leaves 3 to 5-lobed, glabrous. Outer flowers of the cyme

large, without stamens or pistils 2. *Guelder-Rose V.*

The *Laurustinus* of our gardens is a species of *Viburnum* from southern Europe.

1. **Mealy Viburnum.** *Viburnum Lantana*, Linn. (Fig. 457.)

(Eng. Bot. t. 331. *Wayfaring-tree*.)

A large, much branched shrub, the young shoots and leaves thickly covered with a soft mealy down. Leaves ovate, 3 to 5 inches long,



Fig. 457.

2. Guelder-Rose *Viburnum*. *Viburnum Opulus*, Linn.
(Fig. 458.)

(Eng. Bot. t. 332. *Guelder-Rose*.)



Fig. 458.

cordate at the base, bordered by small pointed teeth, very soft and velvety on the upper side, with a more mealy whitish down underneath, without any glands to the leafstalks. Flowers small and white, in dense cymes of 2 to 3 inches diameter. Berries somewhat oblong, of a purplish-black.

In woods and hedges, all over temperate and southern Europe to the Caucasus, penetrating far into Scandinavia. Not unfrequent in southern England, but very doubtfully indigenous in the northern counties or in Scotland, and not recorded from Ireland. *Fl. early summer*.

Not generally a tall shrub when wild, but it will grow into a small tree, and is always glabrous in all its parts. Leaves 2 to 3 inches broad, divided to near the middle into 3 or sometimes 5 broad angular pointed lobes, which are usually coarsely toothed or again lobed; the slender leafstalks have 2 or more sessile glands at the top, and 2 or more linear fringe-like appendages at the base. Flower-cymes like those of the *mealy V.*, except that the outer flowers become much enlarged, attaining often near an inch in diameter, but, having neither stamens nor styles, they are perfectly barren. Berries globular, of a blackish-red.

In hedges and coppices, in Europe and Russian Asia, extending into the Arctic regions. In Britain, however, much less frequent in Scotland than in England and Ireland. *Fl. summer, rather early*. The *Guelder-Rose* of our gardens is a variety, or, more properly speaking, a monstrosity, in which all the flowers are enlarged and barren, giving the cyme a globular shape.

IV. **HONEYSUCKLE.** LONICERA.

Shrubs, or tall climbers, with opposite entire leaves, and white, yellowish, pink, or red flowers, two or more together in terminal or axillary heads. Calyx with a border of 5 small teeth. Corolla with a more or less elongated tube, and an oblique limb either 5-lobed or in two lips, the upper one 4-lobed, the lower entire. Stamens 5. Style filiform, with a capitate stigma. Ovary 2- or 3-celled, with several ovules in each cell. Berry small, with one or very few seeds.

A considerable genus, spread over the temperate regions of Europe, Asia, and North America. It is really a natural one, and very readily distinguished from the adjoining genera by the flowers, although the two principal groups into which it is separable, the climbing *true Honeysuckles* and the erect shrubby *fly Honeysuckles*, are at first sight rather dissimilar in aspect.

Climbers. Flowers long, in terminal heads.

All the leaves distinct at the base 1. *Common H.*

Leaves of the one or two uppermost pairs joined together at the base 2. *Perfoliate H.*

Erect shrub. Flowers short, two together on short axillary peduncles 3. *Fly H.*

Several exotic species of both sections are much cultivated in our gardens and shrubberies.

1. **Common Honeysuckle.** *Lonicera Periclymenum*, Linn. (Fig. 459.)

(Eng. Bot. t. 800. *Woodbine.*)

A woody climber, scrambling over bushes and trees to a considerable height. Leaves ovate or oblong, glabrous above, usually slightly downy or hairy underneath; the lower ones contracted at the base or stalked, the upper ones rounded and closely sessile, but not united. Flowers several together, closely sessile in terminal heads, which are always stalked above the last leaves. Corolla about $1\frac{1}{2}$ inches long. Berries small and red.

In woods, thickets, and hedges, in western and central Europe, from southern Scandinavia to the Mediterranean, but not extending eastward to the Russian frontier. Common in Britain, extending to its northern extremity. *Fl. summer and autumn.*



Fig. 459.

2. Perfoliate Honeysuckle. *Lonicera Caprifolium*, Linn. (Fig. 460.)

(Eng. Bot. t. 799.)



Fig. 460.

Very much like the *common H.*, but quite glabrous; the leaves broader, the uppermost pair in the flowering branches united at the base, and the heads of flowers closely sessile within a pair of leaves united into a single broadly-rounded perfoliate leaf; or the flowers are sometimes separated into two tiers, with a perfoliate leaf under each.

In hedges and woods, in central and south-eastern Europe, and perhaps western Asia, but often confounded with the two common southern species, *L. implexa* and *L. etrusca*. Not truly wild in Britain, but long since cultivated for ornament, it has established itself in some counties of England, and the south of Scotland so as to become almost naturalized. *Fl. spring and early summer.*

3. Fly Honeysuckle. *Lonicera Xylosteum*, Linn. (Fig. 461.)

(Eng. Bot. t. 916.)



Fig. 461.

An erect, much branched shrub, 3 or 4 feet high, of a pale-green, and downy in all its parts. Leaves ovate, entire, and stalked, about $1\frac{1}{2}$ inches long. Flowers of a pale yellowish-white, downy and scentless, only 4 or 5 lines long, hanging two together from short axillary peduncles, with two small narrow bracts close under them. Berries bright scarlet, with 2 or 3 seeds in each.

In thickets and hedges, almost all over Europe and Russian Asia, extending northward to the Arctic Circle. Dispersed over various parts of Britain, generally introduced from cultivation, but believed to be really indige-

nous in some parts of south-eastern England. It is very common in our shrubberies. *Fl. early summer.*

V. **LINNÆA.** LINNÆA.

Calyx with a border of 5 teeth. Corolla campanulate, 5-lobed, narrowed at the base into a short tube. Stamens 4.

A genus of a single species, dedicated to the great master of natural science, with whom it was an especial favourite.

1. **Northern Linnæa.** *Linnæa borealis*, Gronov. (Fig. 462.)

(Eng. Bot. t. 433.)

A slender evergreen, creeping and trailing along the ground to the length of a foot or more. Leaves opposite, small, broadly ovate or obovate, and slightly toothed at the top. Flowering branches short and erect, with 2 or very few pairs of leaves, and terminated by a long slender peduncle, branched near the top into 2 pedicels, each bearing an elegant, gracefully drooping and fragrant flower of a pale pink or white colour, about 5 lines long. Ovary globular and very hairy, the rest of the plant more or less covered with a very minute glandular down, or sometimes quite glabrous.



Fig. 462.

In woods, or rarely in more open rocky situations, in northern Europe and Asia and some parts of North America, re-appearing in the mountain districts of central Europe even on the southern side of the Alps. In Britain confined to the fir-woods of some of the eastern counties in Scotland, and to a single locality in Northumberland. *Fl. summer.*

XXXVII. THE STELLATE TRIBE. STELLATÆ.

(A Tribe of the *Madder* family, or *Rubiaceæ*.)

Herbs, with angular stems, and entire leaves in whorls of 4, 6, or 8 (that is, apparently so, for two opposite ones only of each

whorl are real leaves with buds in their axils, the others, although precisely similar, are in fact stipules), rarely 2 only, the buds and branches always opposite. Flowers small, in terminal or rarely axillary panicles or heads. Calyx combined with the ovary, either entirely so or rarely with a border of 4 or 5 teeth. Corolla monopetalous, with 4 or 5 spreading lobes. Stamens as many, inserted in the tube. Ovary inferior. Style 2-cleft at the top, with a capitate stigma to each branch. Fruit indehiscent, small, dry or rarely succulent, usually separating into 2 seed-like carpels with one seed in each. Albumen horny, with a small embryo.

The *Stellates* are widely diffused over the globe, especially in temperate regions: in the tropics they are more rare, except in mountainous regions. They form a considerable and very natural tribe in the great Natural Order of *Rubiaceæ*, otherwise unrepresented in Britain or even in Europe. It is one of the most extensive ones within the tropics, distinguished by opposite leaves, interpetiolar stipules, an adherent calyx, and a monopetalous corolla, and includes trees and shrubs as well as herbs. Many are cultivated in our stoves, greenhouses, or flower-beds, including the genera *Coffea*, *Gardenia*, *Luculia*, *Pentas*, *Manettia*, *Bouvardia*, etc.

Corolla rotate, the tube very short or indistinct.

Fruit fleshy. Corolla usually 5-lobed 1. **MADDER.**

Fruit dry. Corolla usually 4-lobed 2. **GALIAM.**

Corolla with a distinct tube, as long as or longer than the lobes.

Fruit crowned by the 4 teeth of the calyx. Flowers in heads, surrounded by an involucre 4. **SHERARDIA.**

Calyx not distinct. Flowers in panicles 3. **ASPERULE.**

I. **MADDER.** RUBIA.

A genus only distinguished from *Galium* by the rather larger succulent fruit. The European species have also larger leaves, of a firmer, more shining texture, and the flowers have often four instead of five parts, but these differences scarcely hold good in the South American species.

The species are not numerous, and might rather be considered as forming one or two sections of *Galium*, the South American species being intermediate between the two genera as now established.

1. Wild Madder. *Rubia peregrina*, Linn. (Fig. 463.)

(Eng. Bot. t. 851.)

A straggling herb, of a shining green, sometimes very dwarf, sometimes trailing over bushes and hedges to the length of several feet, clinging by means of short recurved prickles on the edges and midribs of the leaves, and sometimes on the angles of the stem. Rootstock and sometimes also the base of the stem perennial and creeping. Leaves 4 or 6 in the whorl, ovate-oblong or lanceolate, 1 to $1\frac{1}{2}$ inches long, on very short stalks or nearly sessile. Flowers small, greenish, in loose axillary or terminal panicles rather longer than the leaves. Corolla usually 3-lobed. Fruit a small black 2-lobed berry.

In dry woods, and stony places, in western and southern Europe, and eastward to the Caucasus, less frequent in northern France and Germany. In Britain scarcely found beyond the south-western counties of England, the coast of South Wales, and the east coast of Ireland. *Fl. all summer.*

The *dyers' Madder* (*R. tinctoria*), extensively cultivated in southern Europe for the scarlet dye furnished by its roots, differs but very slightly from the *wild M.*, and may be a mere variety.



Fig. 463.

II. GALIUM. GALIUM.

Herbs, with weak, quadrangular stems, sessile leaves, in whorls of 4, 6, or 8, and small white, yellow, or (in exotic species) red flowers, in axillary or terminal trichotomous cymes or panicles, sometimes reduced to small clusters. Calyx completely combined with the ovary, without any visible border. Corolla rotate, the tube scarcely perceptible, with 4 spreading lobes. Fruit small, dry, 2-lobed, with 1 seed in each lobe.

An extensive and natural genus, spread over the whole of the temperate regions of the new as well as of the old world, especially abundant in Europe and northern Asia, penetrating also into the tropics, but there chiefly confined to mountain districts.

Flowers yellow.

Leaves 4 in each whorl, ovate. Cymes axillary, shorter than the leaves 1. *Crosswort G.*

Leaves 6 or 8 in each whorl, linear. Panicles terminal 2. *Yellow G.*

Flowers white.

Leaves in fours.

Fruit hairy 8. *Northern G.*

Fruit glabrous.

Leaves ovate or lanceolate, very shining, and prickly at the edge *Wild Madder.*

Leaves linear, smooth or rough, but not prickly.

Flowers on slender pedicels. Corolla small and rotate 3. *Marsh G.*

Flowers nearly sessile, in little clusters. Corolla funnel-shaped *Common Asperule.*

Leaves 6 or 8 in each whorl.

Perennials. Stem smooth or rough on the angles.

Fruits covered with long hairs *Woodruff Asperule.*

Fruit small, smooth, or slightly granulated.

Lobes of the corolla ending in a fine point. Stems usually 1 to 2 feet, and rather firm at the base 6. *Hedge G.*

Lobes of the corolla scarcely pointed. Stems short, or very slender.

Leaves 4 or 6, very obtuse 3. *Marsh G.*

Leaves 6 or 8, mostly pointed.

Leaves nearly smooth 5. *Heath G.*

Leaves very rough 4. *Swamp G.*

Annuals. Stem very rough at the edges, with adhesive hairs or minute prickles.

Small, very slender plant. Fruit very small, granulated or hairy 7. *Wall G.*

Coarse plants, very adhesive. Fruit rather large, usually covered with stiff hairs or tubercles.

Flowers 3 or more, in axillary panicles longer than the leaves. Fruiting pedicels straight 9. *Cleavers G.*

Flowers 1 or 3, on axillary peduncles, shorter than the leaves. Fruiting pedicels rolled inwards 10. *Corn G.*

1. Crosswort Galium. *Galium Cruciata*, Scop. (Fig. 464.)

(Eng. Bot. t. 143. *Crosswort* or *Maywort*.)

Stock perennial and slender, with a few short, prostrate or creeping barren shoots; the flowering stems erect or ascending, 6 to 18 inches long, and hairy. Leaves in whorls of 4, ovate, 6 to 9 lines long, hairy on

both sides. Flowers small and yellow, in little leafy cymes or clusters, shorter than, or scarcely so long as the leaves. Many of these flowers are males only, and soon fall off, their reflexed pedicels remaining till the stem withers. Fertile flowers few, and often 5-lobed. Fruits small, smooth, almost succulent.

On hedge-banks, and in bushy places, in central and southern Europe, and eastward to the Caucasus. Not unfrequent in England, and extending a considerable way into Scotland, but not mentioned in the Irish Flora. *Fl. spring and early summer.*



Fig. 464.

2. Yellow Galium. *Galium verum*, Linn. (Fig. 465.)

(Eng. Bot. t. 660. *Ladies' Bedstraw*.)

Rootstock woody, often shortly creeping, the whole plant glabrous and smooth, or with only a slight asperity on the edges of the leaves. Stems much branched at the base, decumbent or ascending, 6 inches to above a foot long, ending in an oblong panicle of very numerous, small, yellow flowers. Leaves small, linear, numerous, in whorls of 6 or 8. Fruits small, and smooth.

On banks and pastures, throughout Europe and central and Russian Asia, except the extreme north. Abundant in Britain. *Fl. the whole summer.*

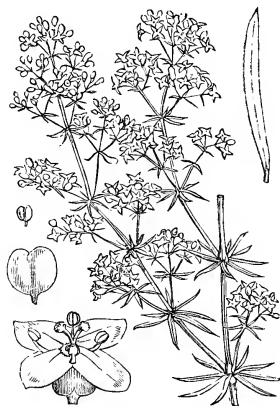


Fig. 465.

3. Marsh Galium. *Galium palustre*, Linn. (Fig. 466.)

(Eng. Bot. t. 1857.)

A weak and slender, glabrous perennial, more generally blackening in drying than any of the following. Stems a foot or more long, with



Fig. 466.

few spreading branches, almost always rough on the angles. Leaves mostly 4 in a whorl, occasionally 5, very rarely 6, linear or oblong, obtuse, without the small point of the three following species; mostly, but not always, rough on the edges. Flowers small, and white, not very numerous, in spreading panicles; the lobes of the corolla without the fine point of the *heath G.* Fruit rather small, slightly granulated.

In marshes and wet places, often quite in the water, but sometimes also in drier situations, and even hanging from the clefts of rocks, extending all over Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Common in Britain. *Fl. summer.*

4. Swamp Galium. *Galium uliginosum*, Linn. (Fig. 467.)

(Eng. Bot. t. 1972, and *G. Witheringii*, Eng. Bot. t. 2206.)

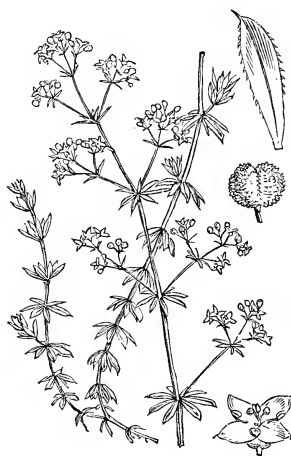


Fig. 467.

Differs from the *marsh G.* in its leaves, either 6 or 8 in a whorl, usually narrower, terminated by a fine point, and less disposed to turn black in drying; from the slender varieties of the *heath G.*, in its stem very rough on the angles, and often 1 to 2 feet long.

Dispersed over Europe and Russian Asia, and occurs in various parts of Britain, but not a very common plant, for although indicated in almost all Floras within the geographical range of the *marsh G.* and the *heath G.*, it is probable that varieties of the one or the other are often mistaken for it. *Fl. summer.*

5. Heath Galium. *Galium saxatile*, Linn. (Fig. 468.)

(Eng. Bot. t. 815, and *G. pusillum*, Eng. Bot. t. 74.)

A small perennial, much branched, leafy, and often tufted at the base; the flowering stems numerous, weak, 5 or 6 inches high, rarely attaining nearly a foot, and smooth, or nearly so, on the angles. Leaves usually 6 in a whorl, sometimes 7 or 8, and occasionally on the barren shoots only 4 or 5; the lower ones small and obovate, the upper narrow, and, when the stem lengthens much, mostly linear; all have a little point at the tip, the edges are smooth or rough, the length seldom exceeds 3 lines. Flowers numerous, and white, in short terminal panicles, the lobes of the corolla scarcely pointed. Fruits small, more or less granulated.

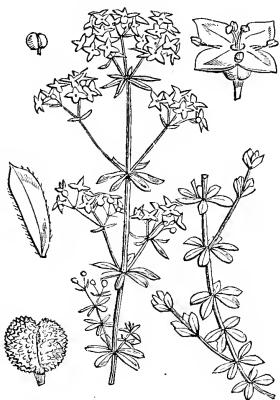


Fig. 468.

In open heaths, and pastures, very common in western and central Europe, but seldom mentioned in the more eastern Floras. In Britain, one of the most universally distributed species. *Fl. summer*. Varieties with narrower leaves, more often 8 in a whorl, have been distinguished under the names of *G. pusillum*, *sylvestre*, *montanum*, *commutatum*, etc.

6. Hedge Galium. *Galium Mollugo*, Linn. (Fig. 469.)

(Eng. Bot. t. 1673.)

Very near the *heath G.*, but on a much larger scale. Stems, from a perennial stock, 1 to 2 or 3 feet long, smooth and shining, and more or less branched. Leaves usually 8 in a whorl, varying from obovate to oblong or linear, more or less rough on the edges, and always terminated by a little point. Flowers white and numerous, in large terminal panicles. Corolla varying from 1 to 2 lines in diameter, each lobe bearing a little point, sometimes rather long, sometimes scarcely prominent. Fruit small and smooth, or slightly granulated.

In hedges, thickets, and rich pastures, widely spread over Europe and western Asia, but neither an Arctic nor perhaps a Siberian species. Very common in England, and in some parts of Ireland, but extends only into the south-eastern counties of Scotland. *Fl. summer*. In shady situations and rich soils the stems are very straggling, swollen above each node, with broader leaves, and spreading panicles. This is

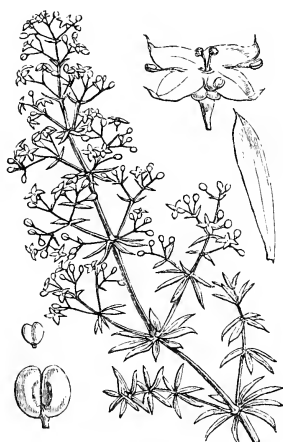


Fig. 469.

considered by many botanists as the only true *G. Mollugo*. In drier, more open situations, the stem is more erect, the leaves narrower, the panicles closer and more oblong, and the points of the corolla more prominent. This form is often described as one or more distinct species, under the names of *G. erectum* (Eng. Bot. t. 2067), *G. cinereum*, and *G. aristatum* (the figures Eng. Bot. Suppl. t. 2783 and 2784 from specimens probably not British).

7. Wall Galium. *Galium parisiense*, Linn. (Fig. 470.)

(*G. anglicum*, Eng. Bot. t. 384.)

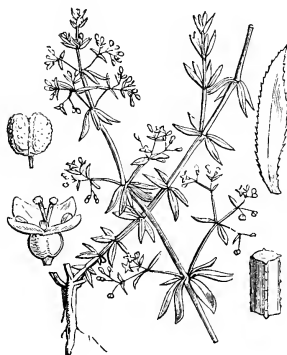


Fig. 470.

Somewhat resembles a very slender *heath G.*, but the root is only annual, and the flowers and fruits are very much smaller. Stems about 6 inches high, the branches almost filiform, spreading, and rough on the edges. Panicles spreading, with filiform pedicels. Corolla white, very minute; the lobes less spreading than in most species, and not pointed. Fruits small, granulated in the only variety hitherto found in Britain; in southern Europe more commonly covered with little bristles or stiff hairs.

In stony wastes, on old walls, etc., very common in the Mediterranean region, and eastward to the Caucasus; less abundant in central Europe, and barely extending to some of the southern counties of England. *Fl. summer*. The variety above alluded to as the only one we possess, has been distinguished as a species under the name of *G. anglicum* or *G. divaricatum*.

8. Northern Galium. *Galium boreale*, Linn. (Fig. 471.)

(Eng. Bot. t. 105.)

Rootstock creeping; the stems more firm and erect, and less branched than in the other species, from $\frac{1}{2}$ to $1\frac{1}{2}$ feet high, glabrous or slightly hoary. Leaves 4 in a whorl, lanceolate or linear, rather firm, with 3 longitudinal ribs, smooth or scarcely rough at the edges, and often an inch long. Flowers numerous, in oblong terminal panicles, white, and rather larger than in the *hedge G.*, with very short, inflected points to the lobes. Fruit covered with hooked hairs or bristles.

On moist rocks, and in mountain pastures, all over northern Europe and Russian Asia to the Arctic regions, confined to mountains in southern Europe and central Asia. Frequent in Scotland, northern England, North Wales, and Ireland. *Fl. summer.*

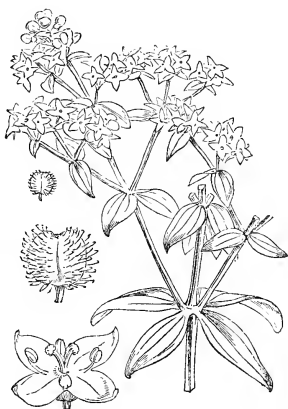


Fig. 471.

9. Cleavers Galium. *Galium Aparine*, Linn. (Fig. 472.)(Eng. Bot. t. 816. *Cleavers. Goosegrass.*)

Although an annual, this plant often extends to several feet, scrambling over bushes, to which it clings by the recurved asperities or small prickles on the angles of the stem and on the edges and mid-ribs of the leaves. Leaves 6 or 8 in a whorl, linear or linear-lanceolate, often above an inch long. Peduncles opposite and axillary, rather longer than the leaves, bearing a loose cyme of from 3 to 8 or 10 small, greenish-white flowers, with 3 or 4 leaves at the base of the cyme. Pedicels 2 to 4 lines long, straight and slender, or but slightly recurved and thickened. Fruits usually covered with hooked bristles, forming small, very adhesive burrs, but sometimes almost or entirely without them.



Fig. 472.

In hedges and thickets, throughout Europe and northern Asia, from the Arctic Circle almost to the tropics, and now spread over North America. Abundant in Britain. *Fl. the whole summer, and often in autumn.* Slender or short varieties, less hispid, and with smaller fruits, have been distinguished under the names of *G. Vaillantii* (Eng. Bot. Suppl. t. 2943) and *G. spurium* (Eng. Bot. t. 1871), but the latter name is also given to luxuriant forms of the *corn G.*

10. Corn Galium. *Galium tricorne*, With. (Fig. 473.)

(Eng. Bot. t. 1641.)

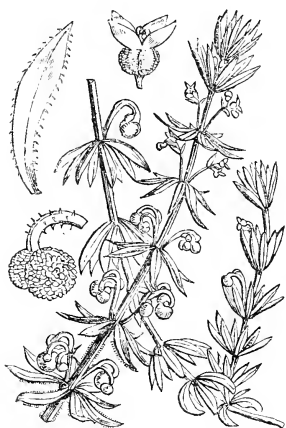


Fig. 473.

Very near the *cleavers G.*, but a smaller plant, seldom above a foot long, the leaves shorter, the peduncles shorter than the leaves, with only 1, 2, or 3 flowers, the pedicels of which are rolled back and thickened after flowering, and the fruit is granulated only, without hooks or bristles.

A much more southern plant than the *cleavers G.*, very common in waste and cultivated places in the Mediterranean region, and eastward to central Asia; becomes a cornfield weed in central Europe, and as such extends over most counties of England, but disappears in the north. *Fl. with the corn, or sometimes later, on the stubble.*

III. **ASPERULE.** ASPERULA.

Differs from *Galium* only in the shape of the corolla, which tapers at the base into a tube at least as long as the lobes, and often several times longer.

The species are less numerous than those of *Galium*, and the geographical range is not so extensive, being limited to Europe, northern Africa, northern and central Asia, and Australia.

Leaves lanceolate, about 8 in a whorl. Fruit hispid . . . 1. *Woodruff A.*
 Leaves linear, opposite or 4 in a whorl. Fruit small, glabrous 2. *Small A.*

1. **Woodruff Asperule.** *Asperula odorata*, Linn. (Fig. 474.)

(Eng. Bot. t. 755. *Sweet Woodruff*.)

Rootstock slender and creeping. Stems erect, 6 inches to near a foot high, smooth on the angles. Leaves usually 8 in a whorl (rarely 6, 7, or 9), the lowest small and obovate, the remainder oblong-lanceolate, above an inch long, slightly rough at the edges. Peduncles terminal, bearing a few small, white flowers, in a loose, trichotomous cyme. Corollas very fugacious. Fruits globular and very hispid. The whole plant has a sweet hay smell in drying.

In woods and shady places, throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. spring and early summer.*

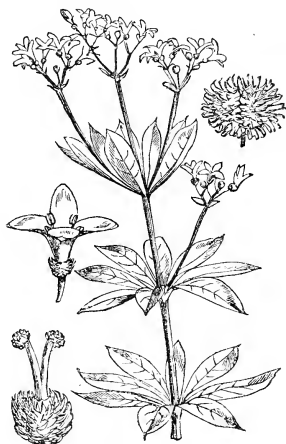


Fig. 474.

2. **Small Asperule.** *Asperula cyanchica*, Linn. (Fig. 475.)

(Eng. Bot. t. 33. *Squinancy-wort*.)

A smooth and glabrous perennial, the stems sometimes erect and wiry, with few leaves, 6 to 8 inches high, sometimes decumbent or spreading on the ground, in broad, leafy tufts or patches. Leaves narrow-linear, the lower ones 4 in a whorl, the upper ones often 2 only, the 2 others wanting or reduced to small stipules. Flowers white, often with a lilac tinge, forming little clusters at the summits of the branches; the corollas little more than a line long, funnel-shaped, tapering into a tube at the base. Fruits small, slightly granulated.

In dry pastures, on warm banks, and waste, stony, and sandy places. Abundant in central and southern Europe to the Caucasus, extending northward more



Fig. 475.

sparingly to the Baltic. Common in many parts of southern England and Ireland, but does not extend into Scotland. *Fl. summer.*

IV. **SHERARDIA.** SHERARDIA.

A single species, with the corolla and fruit of an *Asperule*, and the habit of some southern species of that genus, but distinguished both from *Asperule* and *Galium* by the calyx, which has a distinct border of 4 or 6 teeth crowning the fruit.

1. Blue Sherardia. *Sherardia arvensis*, Linn. (Fig. 476.)

(Eng. Bot. t. 891. *Field Madder.*)



Fig. 476.

A small annual, seldom above 6 inches high. Leaves about 6 in a whorl, the lower ones small and obovate, the upper linear or lanceolate, all rough on the edges and ending in a fine point. Flowers small, blue or pink, in little terminal heads, surrounded by a broad, leafy involucre, deeply divided into about 8 lobes, longer than the flowers themselves. Corolla with a slender tube, little more than a line long, and 4 small, spreading lobes. Calyx-teeth enlarged after flowering, forming a little leafy crown at the top of the fruit.

In cultivated and waste places, in temperate Europe and western Asia, extending far to the north as a weed of cultivation. Common in the greater part of Britain, but becoming scarce in the north of Scotland. *Fl. the whole summer.*

XXXVIII. VALERIAN FAMILY. VALERIANEÆ.

Herbs, either annual or with a perennial, sometimes almost bushy stock, opposite leaves, and no stipules. Flowers in terminal corymbs or panicles, usually small and numerous. Calyx adherent to the ovary, the small border sometimes toothed, sometimes scarcely perceptible at the time of flowering, but unrolling afterwards into a feathery pappus. Corolla in the British genera

monopetalous, tubular at the base, with 5 spreading lobes. Stamens always fewer than the lobes of the corolla. Fruit small, dry, and seed-like, with a single seed suspended from the top of the cell, with the addition frequently of 1 or 2 imperfect or abortive empty cells.

A natural family, not large, but widely diffused over a great part of the globe. Well characterized among inferior-fruited *Monopetals* by the seed-like fruit and reduced number of stamens.

Stamen 1. Tube of the corolla spurred at the base . . . 1. CENTRANTH.

Stamens 3. Tube of the corolla slightly swollen at the base but not spurred.

Perennials. Fruit crowned by a feathery pappus . . . 2. VALERIAN.

Annuals. Fruit crowned by a small, cup-shaped, or toothed border 3. CORNSALAD.

I. **CENTRANTH.** CENTRANTHUS.

Habit, calyx, and fruit of *Valerian*. Corolla with a more slender tube projected at the base into a little spur, and only 1 stamen.

A small genus from the Mediterranean and Caucasian regions.

1. Red Centranth. *Centranthus ruber*, DC. (Fig. 477.)

(*Valeriana*, Eng. Bot. t. 1531. *Red Valerian*.)

Perennial stock much branched, forming when old an almost bushy, coarse tuft; the whole plant quite glabrous and often somewhat glaucous. Stems stout, 1 to near 2 feet high. Leaves ovate-lanceolate, entire or scarcely toothed. Flowers numerous, red or rarely white, in dense cymes, forming a handsome, oblong terminal panicle. Tube of the corolla 3 or 4 lines long, with a spur of at least a line. Border of the calyx unrolling in the ripe fruit into a little elegant, bell-shaped, feathery pappus.

A native of rocky places in the Mediterranean region, but, long cultivated for ornament, it has become naturalized on old walls in most parts of central Europe, as in many localities in England and Ireland. *Fl. all summer*.

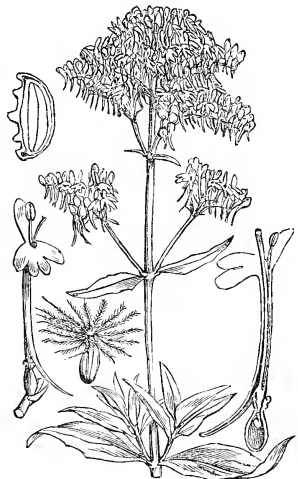


Fig. 477.

II. **VALERIAN.** VALERIANA.

Herbs with a perennial stock and usually erect flowering stems. Leaves opposite, those of the stem usually pinnately divided or toothed, the lowest often entire. Flowers white or red, small, usually numerous, in terminal corymbs or panicles, sometimes contracted into heads. Calyx with a prominent border, at the time of flowering rolled inwards and entire, as the fruit ripens opening out into a little, bell-shaped feathery pappus. Corolla with a short tube, not spurred at the base, and 5 short lobes. Stamens 3. Fruit small, 1-seeded, crowned with the pappus.

A large genus, with the geographical range of the family, but most abundant in mountain regions, where some species ascend to great elevations.

Lower leaves undivided.

Stem 6 to 8 inches high. Radical leaves and segments of the upper ones entire 1. *Marsh V.*

Stem 2 to 4 feet. Leaves large, broadly cordate, and toothed 3. *Pyrenean V.*

All the leaves pinnately divided, with several pairs of segments 2. *Common V.*

1. **Marsh Valerian.** *Valeriana dioica*, Linn. (Fig. 478.)

(Eng. Bot. t. 628.)

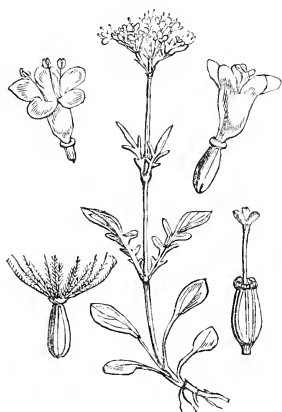


Fig. 478.

Rootstock emitting creeping runners and erect flowering stems, 6 to 8 inches high. Radical leaves and those of the runners on long stalks, ovate, entire, $\frac{1}{2}$ to 1 inch long; stem-leaves few, mostly pinnate, with one oval or oblong terminal segment and several pairs of smaller and narrow ones, all entire. Flowers small, of a pale rose-colour, in terminal corymbs, mostly unisexual; the tube of the corolla short.

A marsh plant, spread over a great part of Europe and eastward to the Caucasus, but apparently more common in the west than in the east; extending northward into southern Scandinavia. In most English counties and in a few of the southern Scotch ones, but not re-

corded from Ireland. *Fl. early summer.*

2. **Common Valerian.** *Valeriana officinalis*, Linn. (Fig. 479.)
(Eng. Bot. t. 698. *All-heal*.)

Rootstock short and thick, with creeping runners, and one or rarely more erect stems, 2 to 3 or even 4 feet high, nearly simple, and more or less hairy at the base. Leaves pinnate, with from 9 to 21, or even more, lanceolate segments, 1 to 2 or even 3 inches long, and much varying in breadth, marked with a few coarse teeth, and more or less sprinkled with hairs underneath; the upper leaves few and distant. Flowers small, white or tinged with pink, in broad terminal corymbs.

In moist situations, sides of ditches and streams, and damp woods, extending over the whole of Europe and Russian Asia to the Arctic Circle, becoming a mountain plant in the south. Common in Britain. *Fl. summer*. A variety with fewer and broader segments to the leaves has been distinguished under the name of *V. sambucifolia*.



Fig. 479.

3. **Pyrenean Valerian.** *Valeriana pyrenaica*, Linn. (Fig. 480.)
(Eng. Bot. t. 1591.)

A taller plant even than the *common V.*, and much coarser; the leaves broadly heart-shaped, coarsely toothed, often 5 or 6 inches long and broad, with more prominent veins than in most *Valerians*, the lower ones undivided, the upper ones, in addition to the large terminal segment, have 1 or sometimes 2 pairs of smaller ones on the short footstalk. Flowers like those of the *common V.*, in large, flat terminal corymbs.

A Pyrenean species, which, having escaped from cultivation, is now well-established in woods and plantations in some parts of central and southern Scotland and western England. *Fl. summer*.



Fig. 480.

III. CORNSALAD. VALERIANELLA.

Low annuals, with forked branches, narrow, entire or scarcely toothed leaves, and very small white or pale-blue flowers, in little compact cymes at the ends of the branches or solitary in the forks. Calyx-border small, entire or toothed, sometimes enlarging as the fruit ripens, but not feathery. Corolla with a short tube, not spurred at the base, and 5 equal, spreading lobes. Fruit small, convex on the back, but often marked in front with 2 longitudinal ribs or variously shaped projections, which are in fact the imperfect or abortive empty cells.

The species are rather numerous, all much alike in general appearance, and distinguished chiefly by modifications in the form of the little fruits which appear to be constant. They are chiefly natives of the Mediterranean and Caucasian regions, but some are spread as weeds of cultivation over the greater part of the temperate regions of the northern hemisphere.

Fruit without any perceptible projecting border on the top.

Fruit as broad as long, somewhat laterally compressed, with a slight furrow on each side . . . 1. *Common C.*

Fruit ovoid, convex on the back, with an oval, concave or cup-shaped appendage on the face . . . 2. *Keeled C.*

Fruit crowned by the small, oblique, toothlike border of the calyx.

Fruit narrow, rather flattened, convex on the back, with 2 longitudinal ribs on the face . . . 4. *Narrow-fruited C.*

Fruit broadly ovoid, showing, when cut across, 3 cells, one with a seed in it, and two conspicuous empty ones . . . 3. *Sharp-fruited C.*

1. **Common Cornsalad.** *Valerianella olitoria*, Poll.

(Fig. 481.)

(*Valeriana locusta*, Eng. Bot. t. 811. *Cornsalad* or *Lamb's-lettuce*.)

A glabrous or slightly downy annual, seldom above 6 inches high, erect or ascending, branching from the base, and repeatedly forked. Radical leaves in a spreading tuft, oblong, $1\frac{1}{2}$ to 2 inches long, rounded at the top, entire or with a very few coarse teeth, narrowed at the base; stem-leaves narrower, but with a broad base, often clasping the stem, and more frequently toothed. Flowers very small, mostly in little, dense, terminal cymes, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, surrounded by small lanceolate or linear bracts. Fruit about a line long and at least as broad, somewhat compressed, without any perceptible calycine border,

and marked on each side with a longitudinal furrow. When cut across, the seed will be seen to occupy the centre, with a somewhat corky mass on one side, and an empty cell on the other.

A native of southern Europe, often cultivated for salad, and now a common weed in waste places and cornfields in central Europe. Not unfrequent in various parts of the British Isles. *Fl. spring and summer.*



Fig. 481.

2. Keeled Cornsalad. *Valerianella carinata*, Lois.

(Fig. 482.)

(*Fedia*, Eng. Bot. Suppl. 2810.)

Closely resembles the *common C.* in everything but the fruit, which is ovoid, not compressed laterally, but rather from front to back, without any corky mass at the back of the seed, and the empty cell in the front is not closed in, but open, in the shape of a little cup-shaped appendage.

More abundant than the *common C.* in most parts of continental Europe, but much less frequent in England. I have not met with it in cultivation, although so similar in foliage. *Fl. spring and summer.*

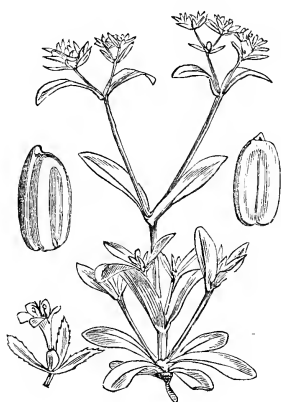


Fig. 482.

3. Sharp-fruited Cornsalad. *Valerianella auricula*, DC.

(Fig. 483.)

(*Fedia*, Eng. Bot. Suppl. t. 2809.)

Stems generally more erect than the last two species, the branches not proceeding from so near the base, more slender and wiry; the leaves small and narrow, the cymes small and not so compact, often with single

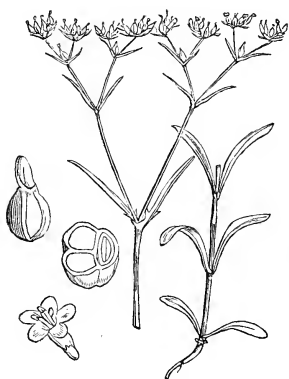


Fig. 483.

flowers in the forks of the stem, and the bracts small and narrow. Fruit broadly ovoid, scarcely compressed, crowned by the little green oblique border of the calyx. On being cut across, it shows one small cell occupied by the seed, and two somewhat larger empty ones.

In cornfields and waste places, widely spread over central and southern Europe and western Asia. Not unfrequent in Britain, and perhaps truly indigenous. *Fl. summer.*

4. Narrow-fruited Cornsalad. *Valerianella dentata*, Koch. (Fig. 484.)

(*Valeriana.* Eng. Bot. t. 1370.)



Fig. 484.

Habit and foliage precisely those of the *sharp-fruited C.*, and the fruit is in the same manner crowned by the oblique border of the calyx, but the fruit is narrower, slightly compressed from front to back, and the seed occupies the entire cavity without any empty cells; these are represented by two longitudinal ribs on the inner face of the fruit, which, when examined under the microscope, will be found to be hollow.

The geographical range appears to be the same as that of the *sharp-fruited C.*, with which it is often confounded. *Fl. summer.* It varies in its fruits more or less hairy, and the calyx-border sometimes cup-shaped, nearly as long as the fruit, and scarcely oblique, some-

times smaller and very oblique, and some of these forms have been distinguished as species, under the names of *V. eriocarpa*, *V. truncata*, etc.

XXXIX. THE TEASEL FAMILY. DIPSACEÆ.

Herbs or undershrubs, with opposite leaves, and no stipules. Flowers collected into compact heads or spikes, surrounded by a common involucre, with scales or hairs on the receptacle between the florets, as in *Composites*, but each floret is moreover inserted in a small *involucel* having the appearance of an outer calyx, sometimes tubular, and completely enclosing the ovary; sometimes cup-shaped at its base. Calyx combined with the ovary, with an entire or toothed border; the teeth often terminating in stiff points or bristles. Corolla monopetalous, 4- or 5-lobed, and often oblique. Stamens 4, inserted in the tube; the anthers free, not united as in *Composites*. Fruit small, dry, and indehiscent, crowned by the border of the calyx, often enclosed in the involucel, which assumes the form of an outer coating. Seed solitary, pendulous.

A small family, spread over the temperate regions of the old world, both in the northern hemisphere and in southern Africa; at once distinguished from *Composites* by the anthers, from capitate *Umbellates* by the opposite leaves and the monopetalous corollas.

Scales of the receptacle between the florets prickly 1. TEASEL.
Scales of the receptacle not prickly, or replaced by hairs . . . 2. SCABIOUS.

I. TEASEL. DIPSACUS.

Tall, erect biennials, either prickly or bearing very stiff hairs. Heads of flowers oblong or globular; the scales between the florets long and prickly. Involucels small and angular, with a very small, thickened border. Calyx with a small, cup-shaped border appearing above the involucel. Corolla oblique, 4-lobed.

A very small European and north Asiatic genus.

Heads of flowers ovoid or cylindrical, very prickly 1. *Common T.*
Heads of flowers globular, very hairy, and slightly prickly . . . 2. *Small T.*

1. **Common Teasel.** *Dipsacus sylvestris*, Linn. (Fig. 485.)
(Eng. Bot. t. 1032.)

A stout biennial, 4 or 5 feet high, with numerous prickles on the stems, the midribs of the leaves, the peduncles, and involucres. Leaves



Fig. 485.

sessile, long and lanceolate, entire or coarsely toothed, the upper ones broadly connate at the base. Heads of flowers at first ovoid, but gradually becoming cylindrical, near 3 inches long and above $1\frac{1}{2}$ inches in diameter. Involucre of 8 to 12 long but very unequal stiff, linear, prickly bracts, usually curved upwards. Scales of the receptacle broad and hairy at the base, ending in a fine prickly point, rather longer than the florets. Flowers pale-lilac.

On roadsides and waste places, in central and southern Europe, and all across Russian Asia, not extending northward beyond Germany. Common in the southern counties of England and in Ireland, more rare in the north, and in Scotland probably only as an introduced plant. *Fl. late in summer or autumn.* The *fullers' Teasel* (*D. fullonum*, Eng.

Bot. t. 2080) is believed to be a cultivated variety of this plant, only differing in the scales of the receptacle being hooked at the extremity.

2. Small Teasel. *Dipsacus pilosus*, Linn. (Fig. 486.)

(Eng. Bot. t. 877.)



Fig. 486.

A branching biennial, 2 to 4 feet high, covered with stiff spreading hairs or bristles, which rarely amount to weak prickles. Leaves with 1 large, ovate, pointed, and coarsely toothed terminal segment, and 1 or 2 pairs of smaller ones on the short leafstalk. Flowers white, forming globular, hispid heads, barely an inch in diameter, on long peduncles. Bracts of the involucre seldom longer than the florets, and passing gradually into the scales of the receptacle, which are ovate, ending in a fine stiff point, almost prickly, about as long as the florets.

In rather moist hedges, thickets, and banks, in central and southern Europe to the Caucasus, extending northwards

to southern Sweden. Occurs in most of the southern and central counties of England, but not in Ireland or Scotland. *Fl. summer and autumn.*

II. SCABIOUS. SCABIOSA.

Herbs, either annual or with a perennial stock, becoming shrubby in some exotic species, without prickles. Heads of flowers hemispherical or globular, with an involucre of small, green, not prickly bracts. Receptacle bearing small not prickly scales, or hairs only, between the florets. Involucels various. Corolla 4- or 5-lobed, often oblique. Ovary and fruit crowned by the little, cup-shaped calycine border, with 4, 5, or more teeth or bristles.

This, the principal genus of the family, belongs chiefly to the Mediterranean region, a few species extending over the rest of Europe and temperate Asia. Although not very numerous in species, it has been broken up into 4, 5, or 6 genera, the three British species being referred severally to *Succisa*, *Scabiosa*, and *Trichera* or *Knautia*.

Leaves entire or nearly so. Florets 4-lobed, the outer ones scarcely larger than the others 1. *Blue S.*

Leaves toothed or divided. Outer florets of each head usually much larger and more oblique.

Florets 5-lobed. Involucel with a spreading, scarious border.

Fruit crowned by 5 bristles 2. *Small S.*

Florets 4-lobed. Involucel very short. Fruit crowned by minute teeth 3. *Field S.*

The annual *sweet Scabious* (*S. atropurpurea*) and some other exotic species are occasionally cultivated in our flower-gardens.

1. Blue Scabious. *Scabiosa succisa*, Linn. (Fig. 487.)

(Eng. Bot. t. 878. *Devil's-bit.*)

Rootstock short and thick, ending abruptly below as if it had been bit off. Leaves mostly radical, stalked, ovate or oblong and entire, glabrous or with a few long hairs on the upper surface; those of the stem few and oblong, occasionally marked with 1 or 2 teeth. Stems 1 to 2 feet high, with 1 to 5 heads of deep-blue flowers on long peduncles. Bracts of the involucre lanceolate, in 2 or 3 rows, the outer ones about as long as the flowers, the inner ones passing gradually into the pointed scales of the receptacle. Florets all nearly alike, 4-lobed, and but



Fig. 487.

little oblique. Involucels tubular, angular, completely enclosing the ovary and fruit, bordered by very small, green teeth. Fruit crowned by the 4 bristles of the calyx, which scarcely project beyond the involucl.

In meadows, pastures, heaths, etc., throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. summer and autumn.*

2. Small Scabious. *Scabiosa Columbaria*, Linn. (Fig. 488.)

(Eng. Bot. t. 1311.)



Fig. 488.

Stock perennial, tufted when old, and sometimes almost woody. Stems 1 to 2 feet high, including the long terminal peduncles, glabrous or slightly hoary. Leaves pinnate, the lower ones crowded, spreading, with an ovate or oblong terminal segment, and several smaller ones; the stem-leaves few, with linear segments entire or pinnatifid. Flowers of a pale purplish-blue. Involucres short. Scales of the receptacle small and linear. Florets 5-lobed, the outer ones of each head much larger and more oblique. Involucel enclosing the fruit to near the top, where it is contracted, and then expands into a scarious, sinuate, cup-shaped border, in the centre of which appears the summit of the fruit, crowned by the 5 bristles of the calyx.

In pastures and waste places, very abundant all over central and southern Europe, extending eastward to the Caucasus, and northward to southern Scandinavia. Dispersed over a great part of England, especially near the east coast, along which it extends into Scotland, but does not occur in Ireland. *Fl. summer and autumn.*

3. Field Scabious. *Scabiosa arvensis*, Linn. (Fig. 489.)

(Eng. Bot. t. 659.)

A perennial, but of short duration, and often flowering the first year, more or less hairy, especially near the base, from 1 to 2 or even 3 feet high. Leaves very variable; the radical ones usually lanceolate and stalked; the upper ones broader at the base, and sessile; all coarsely toothed or slightly lobed, but sometimes some or all are deeply cut or pinnate. Heads of flowers large, of a pale lilac-purple, on long peduncles; the outer florets much larger and more oblique than the central ones, as in the *small S.*, but all are 4-lobed. Involucre short. Receptacle with hairs only between the florets. Involucel very minute. Ovary and fruit angular, crowned by the 8 or 10 radiating teeth or short bristles of the calyx.



Fig. 489.

In pastures, open woods, waste and cultivated places, throughout Europe and Russian Asia to the Arctic Circle. Abundant in Britain. *Fl. all summer.*

XL. THE COMPOSITE FAMILY. COMPOSITÆ.

Herbs, or in some exotic genera or species, shrubs, with alternate or opposite leaves, without stipules. Flowers or *florets* collected several together into a head surrounded by an involucre, the whole having the appearance of a single flower, and called by older authors a *compound flower* with a *common calyx*. The *receptacle*, or enlarged summit of the peduncle on which the florets are inserted within the involucre, either bears chaffy scales and hairs between the florets or is *naked*. In each floret the calyx is combined with the ovary, either completely so or only appears at

its summit as a short border, or more frequently as a *pappus* : that is, a ring of long, simple or feathery (*plumose*) hairs, or of small chaffy scales. Corollas either all tubular, with a 5-toothed (or rarely 4-toothed) border, or all *ligulate* : that is to say, flat, linear or oblong, forming only a short tube at the base ; or else both kinds are in the same head, the central ones tubular, forming the *disk* ; the outer ones ligulate, constituting the *ray*. In the latter case the head of flowers is said to be *radiate*, and in contradistinction a head of flowers that has no ray is said to be *discoid*, and one which has no disk is said to be *ligulate*. Stamens 5 or rarely 4, inserted in the tube of the corolla ; the anthers linear and united (or in *Burweed* closely connivent) in a sheath round the style. Ovary inferior, with a single erect ovule, and a filiform style divided at the top into 2 short branches bearing the stigmas. Fruit a small, dry, seed-like nut, usually called an *achene*, crowned by the pappus or sometimes naked.

The most extensive family among flowering plants, and represented in every quarter of the globe and in every description of station. It is also most easily recognized. The ligular florets are unknown in any other family, and when the florets are all tubular, the *Composites* are distinguished from the *Teasel* family, and the few others which have similar heads or florets, by the union of the anthers. In *Jasione* indeed the anthers are slightly united, but there, besides other characters, the ovary and capsule have 2 cells with several seeds. The genera are very numerous, and the characters are often taken from differences in the achenes and in the pappus which crowns them, which cannot well be observed until the fruit is ripe. It is therefore particularly necessary, in *Composites*, in collecting specimens for determination, to select such as have the most advanced flower-heads, and these will always be found in the centre of the corymb.

1	{	Florets all ligulate (LIGULATES)	37
		Florets all tubular	2
		Florets tubular in the disk or centre of each head, the outer ones either ligulate and forming a ray, or slender and filiform (CORYMBIFERS)	5
2	{	Involucre or leaves prickly. Style slightly bulbous under the branches. (THISTLEHEADS)	29
		Involucre and leaves not prickly	3
3	{	Florets purple, blue, or white	4
		Florets yellow or greenish, usually small (CORYMBIFERS)	5
4	{	Leaves opposite	1. EUPATORY.
		Leaves alternate or radical (THISTLEHEADS)	29

CORYMBIFERS.

- 5 { Leaves opposite 6
 { Leaves alternate or radical 7
- 6 { Flower-heads small, numerous, purple. Pappus of many hairs. 1. EUPATORY.
 { Flower-heads few, rather large, yellow. Pappus of a few bristles. 19. BIDENS.
- 7 { Flower discoid, that is, all the florets of the head tubular or filiform,
 { the outer not longer than the central ones 8
 { Flowers radiate, the outer florets ligulate and spreading, or, if erect,
 { longer than the central ones 18
- 8 { Achenes without a pappus, or crowned by a small cup or short scales . 9
 { Achenes bearing a pappus of hairs 12
- 9 { Flower-heads monœcious, the males with many tubular florets, the fe-
 { males forming a thick burr, ending in 2 conical beaks, and enclosing 2
 { flowers 20. BURWEED.
 { Flower-heads all alike 10
- 10 { Receptacle bearing scales between the florets. Plant covered with a dense
 { white cotton. Leaves entire or toothed 13. DIOTIS.
 { No scales between the florets. Leaves, at least the lower ones, much di-
 { vided 11
- 11 { Flower-heads hemispherical, 3 or 4 lines in diameter, in a large terminal
 { corymb. Achenes angular, with a flat top 14. TANSY.
 { Flower-heads small, often nodding, in a leafy raceme or panicle. Achenes
 { obovate, contracted at the top 15. ARTEMISIA.
- 12 { Bracts of the involucre linear, equal in length, with a few very small outer
 { ones 13
 { Bracts of the involucre imbricated in two or more rows 14
- 13 { Radical leaves large, broadly heart-shaped or orbicular. Stem-leaves
 { small and narrow 2. COLTSFOOT.
 { Leaves pinnate and toothed 17. SENECIO.
- 14 { Plants more or less covered with a white cotton or down. Involucral
 { bracts also cottony, or shining and scarious, or coloured at the edge. 16. CUDWEED.
 { Plants not woolly. Involucral bracts narrow and green 15
- 15 { All the florets tubular and 5-toothed 16
 { Outer florets of the head linear or filiform, although not longer than the
 { central ones 17
- 16 { Involucral bracts few, oblong-linear. Plant growing in salt-marshes. 3. ASTER.
 { Involucral bracts numerous, narrow-linear. Plant growing on limestone
 { rocks 5. LINOSYRIS.
- 17 { Tall stiff plant. Flower-heads ovoid, in a terminal corymb. 7. Rigid INULE.
 { Flower-heads numerous and small, in a long leafy panicle. 4. Canadian ERIGERON.

- 18 { Achenes without any pappus, or crowned by a small cup or minute scales. 19
 { Achenes bearing a pappus of hairs 23
 19 { Receptacle bearing scales between the florets, at least among the central
 ones 20
 { Receptacle naked (without scales between the florets) 21
 20 { Flower-heads rather large, with convex or conical receptacle. 11. CAMOMILE.
 { Flower-heads small, with a small flat receptacle 12. ACHILLEA.
 21 { Involucral bracts all green and of equal length 8. DAISY.
 { Involucral bracts imbricated and scarious at the edges 22
 22 { Receptacle flat or convex 9. CHRYSANTHEMUM.
 { Receptacle conical, much elongated as the fruit ripens 10. MATRICARY.
 23 { Ray purple or blue 24
 { Ray yellow 25
 { Involucral bracts and florets of the ray not numerous, oblong-linear. 3. ASTER.
 24 { Involucral bracts and florets of the ray very numerous and narrow. 4. ERIGERON.
 { Involucral bracts linear, equal in length, or with a few very small outer
 25 ones 26
 { Involucral bracts imbricated in two or more rows 28
 { Radical leaves large, broadly heart-shaped or orbicular, distinct from the
 flowering stem. Florets of the ray narrow and very numerous.
 26 { Radical leaves none, or at the base of the flowering stem. Florets of the
 ray linear or oblong 27
 27 { Achenes of the ray without any pappus 18. DORONIC.
 { Achenes of the ray with a pappus like those of the disk . 17. SENECIO.
 { Florets of the ray not more than 10 or 12. Anthers without tails. 6. GOLDENROD.
 28 { Florets of the ray very numerous, or at any rate above 20. Anthers with
 minute fine points or *tails* at their base 7. INULE.

THISTLEHEADS.

- 29 { Bracts of the involucre entire, obtuse or pointed, but not prickly . . 30
 { Bracts of the involucre ending in a long, stiff point, hooked at the
 extremity 21. BURDOCK.
 { Bracts of the involucre prickly, or ending in a fringed or toothed ap-
 pendage 33
 30 { Hairs of the pappus simple 31
 { Hairs of the pappus feathery 32
 31 { Receptacle chaffy 22. SAWWORT.
 { Receptacle naked 2. COLTSFOOT.
 32 { Leaves entire or coarsely toothed, not prickly 23. SAUSSUREA.
 { Leaves either prickly or bordered with minute stiff bristles 24. THISTLE.

- 33 { Bracts of the involucre ending in a simple point or prickle 34
 { Bracts of the involucre ending in a fringed or toothed appendage, or in
 several points or prickles, or in a prickle branched at the base . . . 35
 34 { Receptacle bearing long chaffy bristles between the florets 24. THISTLE.
 { Receptacle honeycombed with jagged edges to the cavities, but not bristly.
 25. ONOPORD.
 35 { Inner bracts of the involucre long, linear, shining and spreading, outer
 ones very prickly. Achenes silky 26. CARLINE.
 { Bracts of the involucre toothed or jagged, not prickly . 27. CENTAUREA.
 { Bracts of the involucre prickly. Achenes glabrous 36
 36 { Pappus of long simple or feathery hairs 24. THISTLE.
 { Pappus of short simple bristles or none 27. CENTAUREA.

LIGULATES.

- 37 { Achenes, bearing a pappus of numerous long hairs 38
 { Achenes, without a pappus, or crowned by a few short scales . . . 49
 38 { Pappus with some or most of the hairs feathery 39
 { Pappus with all the hairs simple 43
 39 { Involucre (very long) with all the bracts of equal length . 28. SALSIFY.
 { Involucre with outer bracts much smaller, or different from the inner
 ones 40
 40 { External bracts of the involucre 4 or 5, broadly ovate or heart-shaped.
 29. HELMINTH.
 { External bracts of the involucre small and unequal 41
 41 { Receptacle bearing some long chaffy scales between the florets.
 32. HYPOCHÆRE.
 { Receptacle naked 42
 42 { Stem leafy, branched, several-flowered, with clinging, hooked hairs.
 Achenes without a beak 30. PICRIS.
 { Stem almost leafless, simple or slightly branched, with one or very few
 flower-heads. Achenes usually tapering into a short beak.
 31. HAWKBIT.
 43 { Achenes more or less flattened. Leaves glabrous, often bearing prickles
 on the edges or midrib 44
 { Achenes cylindrical or angular. Leaves glabrous, hairy, or downy . 46
 44 { Achenes tapering into a slender beak bearing the pappus 45
 { Pappus sessile or not supported on a distinct, slender beak.
 34. SOWTHISTLE.
 45 { Peduncles radical, with a single flower-head 35. DANDELION.
 { Flowering stems, erect, leafy, bearing several flower-heads 33. LETTUCE.
 46 { Achenes tapering into a slender beak, bearing the pappus 47
 { Pappus sessile or not supported on a distinct, slender beak 48
 47 { Peduncles radical, simple, with a single flower-head . 35. DANDELION.
 { Flowering stems branched, bearing several heads 36. CRÉPIS.

- { Achenes strongly striate, and slightly narrowed at the top. Pappus of
 numerous white hairs. Lower leaves frequently pinnatifid 36. CREPIS.
 48 { Achenes but slightly striate, not narrowed at the top. Pappus of rather
 stiff bristles, of a dirty white. Leaves toothed or entire.
 { 37. HAWKWEED.
 49 { Flowers blue. Pappus a small cup formed of short scales. 38. CHICORY.
 { Flowers small and yellow. No pappus 50
 { Stem 1 to 2 feet, leafy, with several flower-heads . . . 40. LAPSANE.
 50 { Stem leafless, not 6 inches high, hollow under the flower-heads. Leaves
 radical 39. ARNOSERIS.

The very numerous genera of *Composites* are distributed into four great Tribes or Suborders, of which the three following only are represented in Britain :—

I. CORYMBIFERS (*Corymbifera*). Herbs (or, in some exotic species, trees or shrubs), with alternate or opposite leaves, not prickly (except in a few exotic species). Involucres seldom prickly. Outer florets of each head usually ligulate or filiform, or more slender than the central ones, and female or neuter. Central florets usually tubular, small, hermaphrodite, with 4 or 5 short lobes or teeth. Rarely all the florets are tubular, as in *Thistleheads*; but then the style is not swollen under the branches. This vast Suborder is again divided into Tribes, of which the British ones are :—

1. EUPATORIÆ. Branches of the style usually club-shaped or obtuse. *Genera* :—1. EUPATORY; 2. COLTSFOOT.

2. ASTERÆ. Branches of the style usually flattened and pointed. *Genera* :—3. ASTER; 4. ERIGERON; 5. LINOSYRIS; 6. GOLDENROD; 7. INULE; 8. DAISY.

3. SENECTIONÆ. Branches of the style usually truncate at the top, with a tuft of minute hairs, or conical and pointed. *Genera* :—9. CHRYSANTHEMUM; 10. MATRICARY; 11. CAMOMILE; 12. ACHILLEA; 13. DIOTIS; 14. TANSY; 15. ARTEMISIA; 16. CUDWEED; 17. SENECIO; 18. DORONIC; 19. BIDENS.

4. AMBROSIEÆ. Anthers closed round the style, but not united. *Genus*, 20. BURWEED.

II. THISTLEHEADS (*Cynarocephalæ*). Herbs, with alternate or radical leaves, often prickly. Involucres usually globular or ovoid, with numerous imbricated, usually prickly or jagged bracts. Receptacle often thick, and hard. Florets all tubular and regular, with 4 or 5 often narrow lobes. Style slightly swollen below the lobes. *Genera* :—21. BURDOCK; 22. SAWWORT; 23. SAUSUREA; 24. THISTLE; 25. ONOPORD; 26. CARLINE; 27. CENTAUREA.

III. LIGULATES (*Ligulifloræ* or *Chicoraceæ*). Herbs, with alternate or radical leaves, seldom prickly. All the florets ligulate, usually of several rows, the inner ones gradually shorter than the outer ones. *Genera* :—28. SALSIFY; 29. HELMINTH; 30. PICRIS; 31. HAWKBIT; 32. HYPOCHÆRE; 33. LETTUCE; 34. SOWTHISTLE; 35. DANDELION; 36. CREPIS; 37. HAWKWEED; 38. CHICORY; 39. ARNOSERIS; 40. LAPSANE.

Among the numerous exotic genera familiar to us by long or general

cultivation, may be mentioned the *Marigold* (*Calendula*), the *Sunflower* and *Jerusalem Artichoke* (*Helianthus*) the *French* and *African Marigolds* (Peruvian species of *Tagetes*), several *Everlastings* (*Helichrysum*, and other Cape and Australian genera), several species of *Coreopsis*, *Rudbeckia*, *Zinnia*, *Dahlia*, *Ageratum*, etc., all belonging to *Corymbifers*; the *Artichoke* and *Cardoon* (*Cynara*), and the *Globe-Thistle* (*Echinops*), belonging to *Thistleheads*; and *Scorzonera* and *Catananche* among *Ligulates*.

I. EUPATORY. EUPATORIUM.

Herbs (or, in exotic species, shrubs), with leaves mostly opposite, and purplish or white flowers in terminal corymbs. Receptacle without scales. Florets all tubular and equal. Styles much exserted, with long, thickened or club-shaped branches. Achenes angular or striated, with a pappus of simple hairs.

A vast genus, chiefly American, with a few Asiatic species, one of which is also our European one, the only British *Composite* with opposite leaves, and florets not yellow.

1. Common Eupatory. *Eupatorium cannabinum*, Linn. (Fig. 490.)

(Eng. Bot. t. 428. *Hemp Agrimony*.)

Rootstock perennial, the stems erect, 3 or 4 feet high. Leaves 3 to 5 inches long, slightly downy, divided into 3 broadly lanceolate, coarsely toothed lobes, sometimes again slightly lobed, a few upper leaves occasionally simple and alternate. Flower-heads numerous, in compact terminal corymbs, of a pale reddish-purple. Involucres cylindrical, of very few unequal bracts, and usually containing 5 florets.

On banks and bushy places near water, throughout Europe and central and Russian Asia, except the extreme north. Extends all over Britain. *Fl. summer*.



Fig. 490.

II. COLTSFOOT. TUSSILAGO.

Herbs, with perennial, creeping rootstocks, and large, broad, deeply cordate radical leaves; the flowering stems issuing from separate buds, with small, narrow, alternate leaves or scales, and terminal flower-heads, either solitary or in a raceme. Involucre of several linear bracts, with a few small outer ones. Outer florets female, either filiform or narrow-ligulate, the inner ones tubular, or sometimes all tubular. Receptacle without scales. Branches of the style cylindrical or club-shaped. Achenes cylindrical, with a copious pappus of simple hairs.

A genus of very few European or north Asiatic species, easily known among British *Composites* by the peculiar foliage.

Flower-heads solitary, the external florets yellow and narrow ligulate

1. *Common C.*

Flower-heads in a compound raceme, purple or pink, nearly all tubular, or nearly all small and filiform, not ligulate

2. *Butterbur C.*

1. **Common Coltsfoot.** *Tussilago Farfara*, Linn. (Fig. 491.)

(Eng. Bot. t. 429. *Coltsfoot*.)

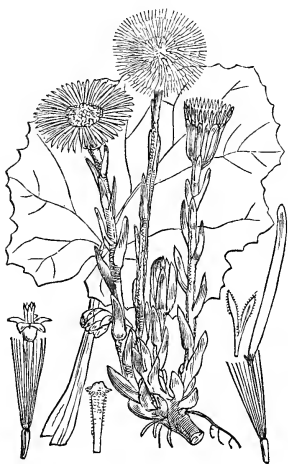


Fig. 491.

Flowering stems simple, but often growing in tufts, erect, about 6 inches high, more or less covered with a loose, white cotton; the small leaves or scales numerous, oblong or linear, entire and erect. Flower-head solitary, terminal; the florets of the ray numerous, ligulate, very narrow, but not long, of a bright yellow. Radical leaves appearing much later than the flower-stems, 4 or 5 inches broad, angular and toothed, covered underneath with a loose, white, cottony wool, of which there is a little also on the upper side.

In waste and cultivated ground throughout Europe and central and Russian Asia to the Arctic Circle, and a very troublesome weed in poor, stiff soils. Abundant in Britain. *Fl. early spring.*

2. Butterbur Coltsfoot. *Tussilago Petasites*, Linn.

(Fig. 492.)

(Eng. Bot. t. 431, and *T. hybrida*, Eng. Bot. t. 430. *Butterbur*.)

Leaves of the *common C.*, but usually larger. Flowering stems not in tufts, often a foot high when full-grown, with many flower-heads, of a dull pinkish-purple, in a narrow-oblong terminal panicle, and almost diœcious. The male plant has a looser panicle of smaller heads, the florets either all tubular and male (the pistil, although apparently perfect, having no ovule and forming no seed), or with a few filiform female ones on the outside; the female panicle more compact, the heads larger, the florets all filiform, or with a few tubular male ones in the centre.

In sandy meadows, on the banks of streams, or roadsides, in Europe and Russian Asia, but not an Arctic plant. Frequent in England, extending into southern Scotland. *Fl. spring*. It is often distinguished from *Coltsfoot* as a genus, under the name of *Petasites*.

The *winter Heliotrope* of our gardens, or *sweet Coltsfoot* (*Tussilago fragrans*), will sometimes establish itself near where it has been planted; it is very near the *Butterbur*, but easily known by its fragrant flowers.

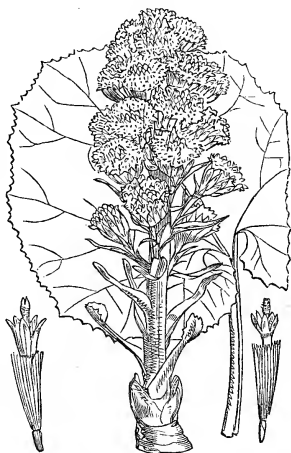


Fig. 492.

III. **ASTER.** ASTER.

Herbs usually erect, with alternate, entire or toothed leaves, and radiate flower-heads in terminal corymbs. Involucral bracts imbricated in few rows. Florets of the ray ligulate, purple or white, those of the disk tubular and yellow. Branches of the style somewhat flattened, and pointed. Anthers without tails. Achenes flattened, with a pappus of many hairs.

A very numerous North American genus, with a few species spread over northern Asia, Europe, and some other parts of the world. Several of the North American ones are known among the autumnal

plants in our flower-gardens, under the name of *Michaelmas Daisies*. Our *China Asters* belong to a nearly allied genus (perhaps a mere section) from eastern Asia.

1. Sea Aster. *Aster Tripolium*, Linn. (Fig. 493.)

(Eng. Bot. t. 87.)



Fig. 493.

A glabrous perennial, seldom above a foot high, erect, or decumbent at the base, and slightly branched; the leaves linear, entire, and somewhat succulent. Flower-heads in a rather compact corymb, the involucre bracts few and oblong. Florets of the ray purplish, not numerous, and occasionally wanting; those of the disk longer than the involucre; the pappus also longer than the involucre.

In salt-marshes, common in Europe and Russian Asia, except the extreme north. Extends along the British coasts to the north of Scotland. *Fl. late in summer, or autumn.*

IV. ERIGERON. ERIGERON.

Differs from *Aster* in the involucre bracts very narrow and numerous, and in the outer florets very numerous, either filiform and not projecting beyond the involucre and pappus, or very narrow-ligulate, forming a short, coloured ray. The regular, tubular, yellowish florets in the centre often reduced to very few.

Its geographical range is even more extended than that of *Aster*, for several species are natives of the tropics; some are found in the extreme Arctic regions, or on the summits of the Alps, whilst others spread as weeds nearly all over the globe.

Outer florets all filiform, not projecting beyond the involucre.

Heads very numerous, and small 3. *Canadian E.*

Outer florets (some or all) forming a shortly projecting coloured ray.

Annual or biennial. Flower-heads several, on rather long peduncles. Ray erect, very little longer than the disk 1. *Common E.*

Perennial. Flower-heads solitary or very few. Ray spreading, considerably longer than the disk 2. *Alpine E.*

Several large-flowered American species are occasionally cultivated in our flower-gardens.

1. **Common Erigeron.** *Erigeron acris*, Linn. (Fig. 494.)

(Eng. Bot. t. 1158. *Fleabane.*)

An erect annual or biennial, 6 inches to a foot high, slightly branched, and rather rough with short hairs. Leaves linear or lanceolate and entire, the radical ones stalked, but usually withered away at the time of flowering. Flower-heads rather small, solitary on the peduncles or upper branches, forming a short, loose panicle. Florets very numerous, mostly filiform and short, the outer rows of a pale purple, projecting slightly beyond the involucre and pappus, the tubular ones of the centre very few, of a pale yellow.



Fig. 494.

In pastures, on banks, roadsides, and waste places, common in the greater part of Europe, from the Mediterranean to the Arctic regions, and in central and Russian Asia. Less frequent in England and Ireland, and rare in Scotland. *Fl. summer and autumn.* It varies much in stature, in the number and size of the flower-heads, and of the florets of the ray, but these are always smaller and more numerous than in the *alpine E.*, much larger and fewer than in the *Canadian E.*

2. **Alpine Erigeron.** *Erigeron alpinus*, Linn. (Fig. 495.)

(Eng. Bot. t. 464, and *E. uniflorus*, Eng. Bot. t. 2416.)

Stock perennial, with erect or ascending hairy stems, 2 to 6 or rarely 8 inches high. Radical leaves oblong-lanceolate, tapering at the base; stem-leaves smaller, few, and lanceolate. Flower-heads solitary on each stem, or rarely 2 or 3 in a loose corymb, each one at least half an



Fig. 495.

inch in diameter ; the florets like those of the *common E.*, except that the outer pink or purplish ones are longer, more decidedly ligulate, forming a distinct spreading ray.

In mountain pastures, in northern Europe, Asia, and America, to the Arctic regions, and in the higher mountain-ranges further south. In Britain, confined to some of the eastern Highlands of Scotland. *Fl. summer, rather late.*

3. Canadian Erigeron. *Erigeron canadensis*, Linn.

(Fig. 496.)

(Eng. Bot. t. 2019.)



Fig. 496.

A stiff, erect annual, 1 to 2 feet high, glabrous, except a few long, spreading hairs. Leaves narrow, and entire or slightly toothed. Flower-heads very small, green or whitish ; very numerous, forming a long, narrow, leafy panicle. Florets minute, the outer ones filiform, scarcely longer than the involucre, and slightly tinged with red ; central ones tubular, yellowish-white.

A native of North America, now established in the greatest abundance as a roadside weed in almost all temperate and hot countries, and appears occasionally as such in England. *Fl. summer and autumn.*

V. **LINOSYRIS.** LINOSYRIS.

Habit, involucre, achenes, and pappus of *Erigeron*, but the florets are all tubular, yellow, and deeply 5-cleft.

A small genus, chiefly North American, with two or three Asiatic species, and a single European one.

1. **Common Linosyris.** *Linosyris vulgaris*, Cass.

(Fig. 497.)

(*Chrysocoma Linosyris*, Eng. Bot. t. 2505. *Goldilocks*.)

A glabrous, erect perennial, 6 inches to a foot high, with numerous narrow-linear, entire leaves, more or less dotted. Flower-heads in a rather compact, terminal corymb, of a bright yellow. Involucre imbricated, with numerous narrow bracts shorter than the florets and pappus. Achenes somewhat compressed, and silky.

In clefts of rocks, and on stony hills, and especially along the gravelly banks of great rivers in south-central and southern Europe to the Caucasus, not extending to northern Germany, although reappearing on the Isle of Oeland, in the Baltic. In Britain, confined to a few limestone cliffs on the southern and western coasts of England. *Fl. end of summer or autumn.*

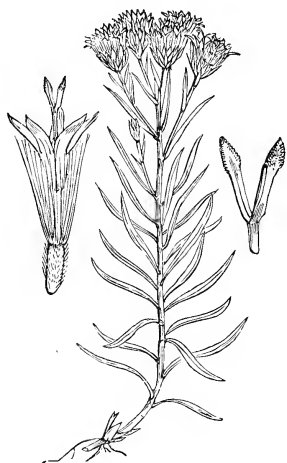


Fig. 497.

VI. **GOLDENROD.** SOLIDAGO.

Herbs, usually tall, perennial, and leafy, with numerous rather small, yellow, radiate flower-heads. Involucre imbricate, in few rows. Receptacle without scales. Outer florets ligulate and few, inner ones tubular, all yellow. Style and anthers of *Aster*. Achenes cylindrical, with a pappus of many simple hairs.

A considerable North American genus, with a single species spreading over central and northern Asia and Europe. It differs from *Aster* in the yellow rays and cylindrical achenes, from *Inula* in the fewer

ligulate florets, besides the microscopical but constant character derived from the tailless anthers.

1. Common Goldenrod. *Solidago Virga-aurea*, Linn.

(Fig. 498.)

(Eng. Bot. t. 301.)



Fig. 498.

Stock more or less tufted. Stems erect, stiff, nearly simple, 6 inches to 2 feet high, glabrous or minutely downy. Radical leaves obovate and stalked, stem-leaves oblong or lanceolate, slightly toothed, shortly tapering at the base. Flower-heads crowded in a narrow-oblong terminal panicle often leafy at the base, not large, of a bright yellow, each with a spreading ray of about 10 or 12 florets, and about twice that number of tubular ones in the disk.

In woods, very common throughout Europe, and central and Russian Asia, and northern America, to the Arctic regions. Abundant in Britain. *Fl. summer and autumn.*

Several North American species have been long cultivated in our flower-gardens, and among them the *S. lanceolata* is said to have occasionally established itself in their vicinity.

VII. **INULE.** INULA.

Herbs, usually erect, with alternate, entire or toothed leaves. Flower-heads in terminal corymbs or panicles, or rarely solitary. Involucral bracts imbricated in several rows. Florets all yellow, the outer rows ligulate and radiating, or rarely short and concealed by the involucre; those of the disk tubular. Receptacle without scales. Achenes cylindrical or angular, with a pappus of many hairs. Anthers tipped at the lower end by two minute hair-like points called *tails*.

A numerous European and north Asiatic genus, technically distinguished from *Goldenrod* by the tails of the anthers; but these, though

constant, are so minute as not to be seen without a careful dissection and good magnifier. The florets of the ray are also very numerous and narrow in *Inule*, much fewer and broader in *Goldenrod*.

Flower-heads very large, with broadly ovate involucrel bracts 1. *Elecampane I.*
Flower-heads less than an inch in diameter. Involucrel
bracts narrow.

Rays considerably longer than the involucre.

Glabrous plants, with narrow thick, succulent leaves . 2. *Samphire I.*

Downy plant, with flat, ovate or oblong, stem-clasping
leaves 4. *Common I.*

Rays very minute, concealed by the involucre, or scarcely
longer.

Tall perennial. Flower-heads ovoid, in dense corymbs 3. *Rigid I.*

Annual, scarcely a foot high. Flower-heads broad, softly
downy, in a loose, leafy corymb 5. *Small I.*

1. *Elecampane Inule. Inula Helenium*, Linn. (Fig. 499.)

(Eng. Bot. t. 1546. *Elecampane*.)

A coarse perennial, with stout, erect, scarcely branched stems, about 2 feet high. Radical leaves often a foot long, oblong, and narrowed into a stalk; the upper ones ovate or oblong, clasping the stem, nearly glabrous above, more or less softly hairy underneath. Flower-heads very large, solitary at the ends of the branches. Involucrel bracts broadly ovate and softly hairy. Florets of the ray numerous, long, and linear.

In rich hilly pastures, in central and southern Europe, and eastward to the Caucasus and Himalaya, and, having been much cultivated in former days in herb-gardens, it has established itself in many places further north. It may therefore be only an introduced plant in Britain, when growing, as it generally does, in the neighbourhood of old castles and gardens; but it is also believed to be truly indigenous in some parts of southern England, South Wales, and Ireland. *Fl. summer and autumn.*



Fig. 499.

2. Samphire Inule. *Inula crithmoides*, Linn. (Fig. 500.)

(Eng. Bot. t. 68. *Golden Samphire*.)

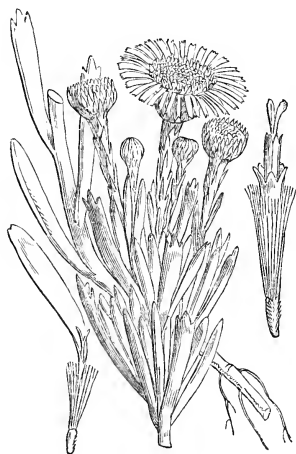


Fig. 500.

A glabrous, erect perennial, about a foot high or rather more. Leaves numerous, linear, thick and succulent, entire or with one or two small teeth at the base. Flower-heads not large, solitary on the short branches of a short, leafy panicle. Involucral bracts numerous and narrow. Florets of the ray bright-yellow and spreading, not so narrow or so numerous as in the other species, yet twice as many as in the *common Golden-rod*.

In salt-marshes, in western Europe, and all round the Mediterranean; frequent on the southern and western coasts of Britain up to Kirkcudbright and Wighton, both in salt-marshes and on dry maritime limestone rocks. *Fl. summer and autumn*.

3. Rigid Inule. *Inula Conyza*, DC. (Fig. 501.)

(*Conyza squarrosa*, Eng. Bot. t. 1195. *Ploughman's Spikenard*.)



Fig. 501.

A hard, erect biennial, 2 to 3 feet high, covered with a short down, rough on the stem, soft and cottony on the under side of the leaves. Leaves ovate-lanceolate, the lower ones stalked, the upper sessile. Flower-heads numerous, in a terminal corymb. Involucre ovoid; the bracts numerous, the outer ones tipped with green, the inner linear, reddish, and erect. Outer florets numerous but very small, their purple styles alone protruding beyond the involucre, so that the plant appears at first sight to have no ray.

In hedges and open woods, on banks and roadsides, in central and southern Europe to the Caucasus, extending northwards into Denmark, but not into north-

eastern Germany. In Britain, as far north as Westmoreland, but neither in Ireland nor Scotland. *Fl. summer and autumn.*

4. Common Inule. *Inula dysenterica*, Linn. (Fig. 502.)

(Eng. Bot. t. 1115. *Fleabane.*)

Rootstock perennial, with ascending or erect stems 1 to 2 feet high, loosely branched, and, as well as the foliage, more or less downy or woolly. Leaves oblong, much waved, clasping the stem with rounded auricles. Flower-heads pedunculate in the upper axils or at the ends of the branches, hemispherical, rather more than half an inch in diameter, with a ray of very numerous, linear, spreading florets of a bright-yellow. Involucral bracts also numerous and narrow. Pappus-hairs few and shorter than in the three preceding species, and enclosed at the base in a minute membranous cup.

In wet pastures, ditches, and roadsides, in central and southern Europe and western and central Asia, extending northwards to the Baltic. Abundant in southern England and Ireland, becoming rare in the north, and scarcely found in Scotland. *Fl. summer and autumn.* This and the following species are sometimes separated as a genus, under the name of *Pulicaria*.



Fig. 502.

5. Small Inule. *Inula Pulicaria*, Linn. (Fig. 503.)

(Eng. Bot. t. 1196. *Fleabane.*)

An erect, branching annual, seldom a foot high, with narrower and less woolly leaves than the *common I.*, which it resembles in many respects. Flower-heads much smaller, and the florets of the ray, although very numerous, yellow, and spreading, are so short as at first sight to escape observation. The minute outer scales of the pappus are distinct, not forming a little cup as in the *common I.*



Fig. 503.

In moist waste places, roadsides, and sandy heaths, ranging over Europe, extending eastward across Russian Asia, and northward to southern Sweden. In Britain, chiefly in south-eastern England, and not known either in Ireland or Scotland. *Fl. summer and autumn.*

VIII. **DAISY.** *BELLIS.*

Low herbs, with alternate or radical, entire or toothed leaves. Flower-heads solitary, on radical or axillary peduncles, with a yellow disk and white or pink ray. Involucre hemispherical, with many bracts of equal length, in about two rows, and green, not scarious, at the tips. Receptacle conical, without scales. Achenes compressed, without any pappus. Style nearly that of *Aster*.

A small genus, extending over the temperate regions of the northern hemisphere.

1. **Common Daisy.** *Bellis perennis*, Linn. (Fig. 504.)

(Eng. Bot. t. 424.)

Stock perennial, tufted. Leaves radical, obovate or oblong, slightly toothed. Peduncles also radical, leafless, bearing single flower-heads. Involucres green, nearly glabrous. Florets of the ray ligulate, white or tinged with pink; those of the disk numerous, small, and tubular.

In pastures, common throughout Europe, except the extreme north, but apparently not extending eastward beyond the Caucasus, nor ascending high into mountain regions. Abundant all over Britain. *Fl. nearly the whole year round.*



Fig. 504.

IX. CHRYSANTHEMUM. CHRYSANTHEMUM.

Annual or perennial herbs (or in some exotic species, shrubs), with alternate toothed or variously dissected leaves, and radiating flower-heads, solitary on terminal peduncles, or in corymbs. Involucres hemispherical, with a few rows of imbricate bracts, more or less scarious on the edges. Receptacle flat or convex, without scales. Achenes angular or striate, without any pappus, but sometimes crowned with a minute raised border. Style nearly that of *Senecio*.

A considerable genus, extending over Europe, northern and central Asia, and northern Africa. It has been divided by modern botanists into a number of small genera, founded upon minute, almost microscopical, characters, having little relation to general habit. Among them *Pyrethrum* has been the most generally adopted, although botanists are but little agreed as to the characters or species which should be assigned to it.

Ray yellow 2. *Corn C.*

Ray white.

Leaves toothed only 1. *Oxeye C.*

Leaves pinnate.

Flower-heads in corymbs. Segments of the leaves pin-
natifid and toothed 3. *Feverfew C.*

Flower-heads on terminal peduncles. Leaves 2 or 3 times
pinnate, with narrow-linear or filiform lobes 4. *Scentless C.*

The old *yellow* and *white Chrysanthemums* of our cottage gardens

belong to a north African species (*C. coronarium*). The late autumnal flowers now so generally cultivated, under the name of *Chrysanthemums*, are varieties of the *C. indicum* from China.

1. **Oxeye Chrysanthemum.** *Chrysanthemum Leucanthemum*, Linn. (Fig. 505.)

(Eng. Bot. t. 601. *Oxeye Daisy*.)



Fig. 505.

A perennial, with erect, simple or slightly branched stems, 1 to 2 feet high, glabrous or slightly downy. Radical leaves obovate and coarsely toothed, on long stalks; stem-leaves narrow, sessile, with a few coarse teeth. Flower-heads solitary on long terminal peduncles, and rather large. Involucral bracts bordered by a brown, scarious edge. Florets of the ray white, more than half an inch long; those of the disk numerous, small, and yellow.

In pastures, on banks, etc., throughout Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Extends all over Britain. *Fl. summer, commencing in spring.*

2. **Corn Chrysanthemum.** *Chrysanthemum segetum*, Linn. (Fig. 506.)

(Eng. Bot. t. 540. *Corn Marigold*.)

A glabrous, erect annual, about a foot high or rather more, with spreading branches. Lower leaves obovate and stalked; upper ones narrow and stem-clasping, generally with a few deeply-cut teeth at the top. Flower-heads rather large, on terminal peduncles; the involucre bracts broadly scarious; the florets of the ray as well as the disk of a deep golden-yellow.

A cornfield weed, probably of Mediterranean origin, but now common all over Europe, except the extreme north. Abundant in Britain. *Fl. summer and autumn.*



Fig. 506.

3. Feverfew *Chrysanthemum*. *Chrysanthemum Parthenium*, Pers. (Fig. 507.)

(*Pyrethrum*, Eng. Bot. t. 1231. *Matricaria*, Bab. Man.)

Stock perennial, shortly branched; the flowering stems erect, branching, a foot high or rather more. Leaves pinnate; the segments ovate or oblong, pinnatifid and toothed. Flower-heads numerous, about half an inch in diameter, in a terminal corymb; the florets of the ray white, ovate or oblong, those of the disk numerous and yellow. Achenes crowned by a minute toothed border.

On roadsides, and in waste places, in central and southern Europe to the Caucasus, and spread from cultivation much further north, as well as to many other parts of the globe. Dispersed over a great part of Britain, but perhaps not truly indigenous. *Fl. summer.* A very double variety is now frequent in our flower-gardens.



Fig. 507.

4. Scentless Chrysanthemum. *Chrysanthemum inodorum*,
Linn. (Fig. 508.)

(Eng. Bot. t. 676. *Matricaria*, Bab. Man.)

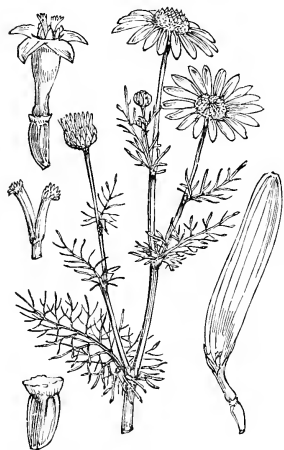


Fig. 508.

An erect or spreading, branched annual, 1 to 1½ feet high, with the leaves of a *Camomile*, twice or thrice pinnate, with numerous narrow-linear, almost capillary lobes. Flower-heads rather large, on terminal peduncles. Involucral bracts with a brown, scarious edge, as in the *Oxeye C.* Florets of the ray white, about 7 or 8 lines long; those of the disk numerous and yellow. Receptacle convex, hemispherical, or ovoid, but not so conical nor hollow as in *Matricary*. Achenes prominently ribbed, crowned with a minute, entire or 4-toothed border, and marked outside near the top with two glandular spots.

In fields and waste places, common in Europe and Russian Asia, from the Mediterranean to the Arctic regions. Extends all over Britain. *Fl. the whole season.* A maritime variety, with the leaves rather succulent, and the flowers not so large, has been considered as a distinct species (*Pyrethrum maritimum*, Eng. Bot. t. 979).

X. **MATRICARY.** MATRICARIA.

Habit, foliage, and conical receptacle of *Camomile*, but the receptacle without scales, as in *Chrysanthemum*. Achenes, as in both genera, angular or striate, without any pappus, but sometimes crowned with a minute border.

A very small European, northern Asiatic, and North American genus.

1. Common Matricary. *Matricaria Camomilla*, Linn.
(Fig. 509.)

(Eng. Bot. t. 1232. *Wild Camomile*.)

Resembles so closely the *fetid Camomile* that it can scarcely be distinguished but by the absence of the scales between the florets. It is, like

that plant, an erect, branching annual; the leaves twice or thrice pinnate, with short but very narrow linear segments, and the flower-heads rather large, on terminal peduncles. Involucral bracts all nearly of the same length, with scarious edges. Ray florets white. Receptacle much elongated as the flowering advances, and hollow. Achenes without any border at the top.

In fields and waste places, in Europe and Russian Asia. Probably diffused all over Britain, but often confounded with the *corn* or the *fetid Camomile*. *Fl.* the whole season.

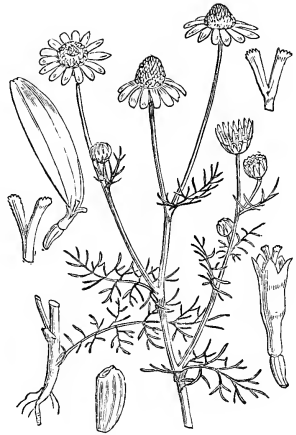


Fig. 503.

XI. CAMOMILE. ANTHEMIS

Herbs, with alternate, much cut leaves, and radiating flower-heads, solitary on terminal peduncles, or in a loose corymb. Involucres hemispherical, with a few rows of bracts more or less scarious on the edges. Receptacle convex or conical, with scales between all or at least the central florets. Achenes angular or striate, without any pappus, or crowned by a minute border. Style nearly that of *Senecio*.

A rather large genus, spread over Europe, temperate Asia, and northern Africa; differing from most *Chrysanthemums* in habit, and from all in the scales of the receptacle. It has recently been divided into several groups, too technical to be adopted as genera.

Rays yellow 4. *Yellow C.*
Rays white.

Florets of the ray without any style. Erect, glabrous annual 1. *Fetid C.*

Florets of the ray with a style. Plant downy.

Procumbent or creeping perennial. Receptacle-scales
oblong and obtuse 3. *Common C.*

Erect or decumbent branching annual. Receptacle-scales
narrow and pointed 2. *Corn C.*

1. Fetid Camomile. *Anthemis Cotula*, Linn. (Fig. 510.)(Eng. Bot. t. 1772. *Stink Mayweed*.)

Fig. 510.

An erect, branching annual, a foot high or rather more, glabrous, but sprinkled with glandular dots, and emitting a disagreeable smell when rubbed. Lower leaves twice or thrice, upper ones once pinnate, with very narrow-linear, short, pointed lobes, entire or divided. Flower-heads in a loose terminal corymb. Involucre slightly cottony, the inner bracts scarious at the top. Receptacle convex from the beginning, lengthening out as the flowering advances into a narrow oblong shape, with a few linear, pointed scales among the central florets. Ray-florets white, without any trace of the style. Achenes rough with glandular dots, without any border.

In cultivated ground, and waste places; a common weed all over Europe and Russian Asia, except the extreme north. Abundant in southern England and Ireland, much less so in the north, and rare in Scotland. *Fl.* all summer and autumn.

2. Corn Camomile. *Anthemis arvensis*, Linn. (Fig. 511.)

(Eng. Bot. t. 602.)

A coarser plant than the *fetid C.*, sometimes biennial, often decumbent, more or less downy with minute silky hairs, the leafy branches terminating in single flower-heads. Segments of the leaves shorter, and not so narrow as in the last, the flower-heads rather larger, the bracts of the receptacle usually broader, and the florets of the ray have always a style although they do not always perfect their fruit.

Less widely diffused than the *fetid C.*, and chiefly south European, but extends also over a great part of the Continent. Certainly not very common in England or Ireland, and local or rare in Scotland, but so frequently confounded with allied species that its precise distribution is difficult to ascertain. *Fl.* spring and summer. A maritime variety, with a more spreading stem and thicker leaves,

found on the north-east coast of England, has been figured as *A. maritima* (Eng. Bot. t. 2370), but the true plant of that name is limited to the shores of the Mediterranean. The British plant has been since described as a species, under the name of *A. anglica*.



Fig. 511.

3. Common Camomile. *Anthemis nobilis*, Linn. (Fig. 512.)

(Eng. Bot. t. 980.)

A procumbent or creeping, branched perennial; the flowering branches shortly ascending, and leafy. Segments of the leaves fine, and pointed as in the *fetid C.*, but fewer and more compact. Flower-heads on terminal peduncles, with white rays. Inner involucre bracts more scarious at the top than in the last two species. Scales of the receptacle rather broad, obtuse, and nearly as long as the central florets.

A native, apparently, of western Europe, and chiefly of sandy pastures near the sea, but having been long cultivated, it has established itself in so many places that its precise area cannot well be made out. Evidently indigenous in southern England and Ireland, but decreases rapidly northward, and not a true native of Scotland. *Fl. summer and autumn.*



Fig. 512.

4. **Yellow Camomile.** *Anthemis tinctoria*, Linn. (Fig. 513.)

(Eng. Bot. t. 1472.)



Fig. 513.

This has much the habit and aspect of the *corn C.*, but is usually a taller plant and more downy, the leaves less divided, with pinnatifid or toothed segments, the flower-heads rather larger, and the rays of a bright-yellow.

In cultivated and waste places, in central and eastern Europe and Russian Asia, abundant in Denmark and eastern France, but scarcely further west. In Britain, said to be indigenous in some of the eastern counties of England. *Fl. end of summer.*

XII. **ACHILLEA.** ACHILLEA.

Herbs, mostly perennial, with alternate, much divided, or rarely simple leaves; the flower-heads rather small, in a terminal corymb, with white or pink rays, and a yellow disk. Involucres ovoid or hemispherical, the bracts imbricated, only slightly scarious on the edges. Receptacle small, not convex, with scales between the florets. Achenes without any pappus. Style nearly that of *Senecio*.

A considerable European and west Asiatic genus, divided by modern botanists into two sections or genera, represented by the two British species, but separated by very trifling characters.

Leaves linear, serrated. Flower-heads few, hemispherical . 1. *Sneezewort A.*

Leaves much divided. Flower-heads numerous, small, and

ovoid 2. *Milfoil H.*

1. **Sneezewort Achillea.** *Achillea Ptarmica*, Linn. (Fig. 514.)(Eng. Bot. t. 757. *Sneezewort*.)

Rootstock perennial and creeping. Stems erect and glabrous, 1 to 2 feet high, nearly simple. Leaves rather broadly linear, and regularly

serrate. Flower-heads few, in a loose terminal corymb. Involucre hemispherical, slightly cottony, smaller than in the *Camomiles*, but much larger than in the *Milfoil A.* Florets of the ray generally from 10 to 15, short, broad, and white; those of the disk numerous, interspersed with small linear scales.

In moist, chiefly hilly pastures, in northern and central Europe and Russian Asia, becoming a mountain plant in southern Europe, yet not extending to the Arctic regions. Common in Britain. *Fl. summer, rather late.*



Fig. 514.

2. **Milfoil** *Achillea*. *Achillea Millefolium*, Linn. (Fig. 515.)

(Eng. Bot. t. 758. *Milfoil* or *Yarrow*.)

Stock perennial, creeping underground, with numerous short, leafy barren branches, and erect, almost simple flowering stems, about a foot high. Leaves oblong or linear in their outline, but finely cut into numerous short, but very narrow and deeply pinnatifid segments. Flower-heads numerous, small, and ovoid, in a dense terminal corymb. Florets of the ray seldom above 5 or 6 in each head, white or pink.

In pastures, meadows, waste places, etc., very abundant in Europe and Russian Asia from the Mediterranean to the Arctic Circle, and extends over a great part of North America. It is also one of the commonest of British plants. *Fl. the whole summer.* It varies with the foliage nearly glabrous or densely covered with white woolly hairs.



Fig. 515.

XIII. **DIOTIS.** DIOTIS.

A single, very cottony species, distinguished generally from *Achillea* by the florets, all tubular, with two projecting *ears* at the base, which enclose the achene and remain upon it after the upper part falls off.

1. Sea Diotis. *Diotis maritima*, Cass. (Fig. 516.)

(*Santolina*. Eng. Bot. t. 141.)

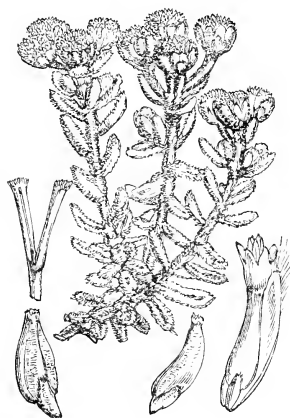


Fig. 516.

Rootstock perennial and creeping; the stems branching at the base, hard and almost woody, seldom a foot high, covered, as well as the leaves and involucre, with a dense, white, cottony wool. Leaves alternate, oblong, entire or slightly toothed, about half an inch long. Flower-heads nearly globular, about 4 lines diameter, in dense terminal corymbs. Florets yellow and small. Receptacle convex, with scales between the florets. Achenes without pappus or border except the persistent base of the floret.

In maritime sands on the Mediterranean and Atlantic. Extends on the English coasts up to Anglesea on one side and Suffolk on the other, found also on the coast of Waterford in Ireland. *Fl. end of summer or autumn.*

XIV. **TANSY.** TANACETUM.

Herbs, with much divided, alternate leaves. Flower-heads hemispherical, in terminal corymbs. Involucral bracts imbricated, scarious at the edges. Receptacle without scales. Florets yellow, all tubular, or the outer ones ligulate but not longer than the others. Achenes angular, with a flat top, without any pappus.

A small genus, from the Mediterranean and Caucasian regions, differing from *Artemisia* technically in the shape of the achene, but more evidently in the larger, more yellow, corymbose, not paniculate, flower-heads.

1. **Common Tansy.** *Tanacetum vulgare*, Linn. (Fig. 517.)
(Eng. Bot. t. 1229.)

A stout, erect perennial, 2 to 3 feet high, glabrous or slightly downy, with a strong scent and bitter savour. Root-stock creeping. Leaves rather large, pinnate, with oblong-linear, pinnatifid or toothed segments. Flower-heads numerous, hemispherical, about 4 lines diameter, of a golden yellow, in a large terminal corymb.

On the edges of fields, roadsides, and waste places, in Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Extends all over Britain, either indigenous or in some places introduced. *Fl.* end of summer.



Fig. 517.

XV. **ARTEMISIA.** ARTEMISIA.

Herbs or shrubs, usually highly aromatic, with narrow, alternate leaves, usually much divided, and often white or grey, at least on the under side. Flower-heads small, in terminal leafy racemes or panicles. Involucral bracts imbricated, usually loosely cottony, with slightly scarious edges. Florets the length of the involucre, yellow or greenish, either all tubular and 5-toothed, or the central ones tubular, 5-toothed, and male or barren, and the outer ones filiform, or 3-toothed, female, and fertile. Receptacle without scales. Achenes obovate, rounded or narrow at the top, without any pappus.

A numerous genus, often covering vast tracts of land in eastern Europe and central Asia, and extending over nearly the whole of the northern hemisphere from the Arctic regions to the borders of the tropics.

Stem spreading, much branched. Segments of the leaves narrow-linear or subulate.

Stem and leaves cottony-white. Involucre narrow-ovoid or cylindrical, cottony 2. *Sea A.*

- Stem and leaves green or reddish. Involucres ovoid, glabrous 1. *Field A.*
- Flowering stems or branches tall and erect. Segments of the leaves flat, broadly linear, or lanceolate.
- Leaves green above, white underneath, with pointed segments 3. *Common A.*
- Leaves silky, whitish on both sides, with obtuse segments 4. *Wormwood A.*

The shrubby *Southernwood* and the *Taragon* of our gardens are species of *Artemisia*; the latter (*A. Dracunculus*) is one of the very few species in which the leaves are not dissected.

1. Field Artemisia. *Artemisia campestris*, Linn. (Fig. 518.)

(Eng. Bot. t. 333.)

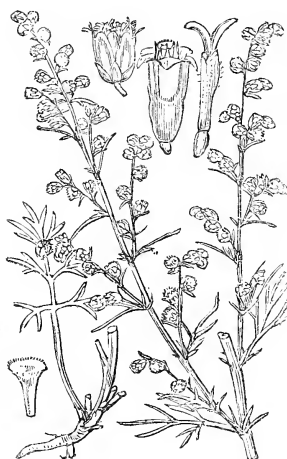


Fig. 518.

Stock herbaceous and hard, or shrubby, low, and branched; the annual branches twiggy, very spreading or procumbent, a foot long or more, nearly glabrous, often turning red. Leaves small, once or twice pinnate, with few very narrow-linear segments, green, at least on the upper side. Flower-heads small, ovoid, in numerous loose spikes or racemes, forming a long leafy panicle. Involucre not cottony, containing 5 or 6 outer female florets, and about as many central, male or barren ones.

In heaths, and dry, sandy, or stony wastes, widely spread over Europe and temperate Asia, extending far into Scandinavia. In Britain, almost peculiar to a small tract of country in the north-west of Suffolk and adjacent portion of Norfolk. *Fl. autumn.*

2. Sea Artemisia. *Artemisia maritima*, Linn. (Fig. 519.)

(Eng. Bot. t. 1706, and *A. gallica*, Eng. Bot. t. 1001.)

A much branched, decumbent or nearly erect undershrub, more or less covered with a close white cotton. Leaves twice pinnate, with narrow-linear segments, shorter and more compact than in the *field A.*

Flower-heads small, narrow-ovoid or nearly cylindrical, erect or drooping, each containing from 3 to 5 or 6 florets, all tubular and fertile.

In sandy wastes, generally near the sea, occupying large tracts of country near the Caspian and Black Seas, and extending round the Mediterranean, and along the Atlantic, up to the coasts of Britain, where however it is not very frequent. *Fl. autumn.*

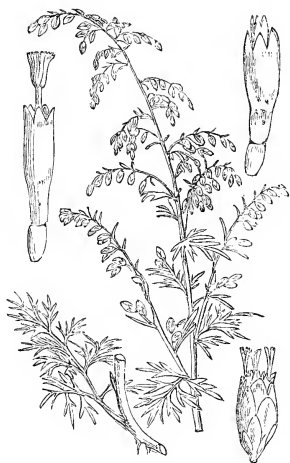


Fig. 519.

3. Common Artemisia. *Artemisia vulgaris*, Linn.

(Fig. 520.)

(Eng. Bot. t. 978. *Mugwort.*)

Stock thick and woody, but short, with erect flowering stems, 2 to 3 feet high. Leaves once or twice deeply pinnatifid, with lanceolate, pointed lobes or segments, coarsely-toothed or lobed, green and glabrous above, very white underneath. Flower-heads ovoid, with cottony involucres, forming a long terminal panicle, each head containing 12 to 20 complete florets and a few female ones, all fertile.

On roadsides and waste places, either indigenous or introduced, over nearly the whole area of the genus. Common in Britain. *Fl. end of summer, and autumn.* The *A. cærulescens* (Eng. Bot. t. 2426) is a garden variety of this plant.



Fig. 520.

4. Wormwood *Artemisia*. *Artemisia Absinthium*, Linn.
(Fig. 521.)

(Eng. Bot. t. 1230. *Wormwood* or *Absinth.*)



Fig. 521.

Stock short, but branched and leafy, sometimes almost woody; the flowering stems erect and hard but annual, 1 to 2 feet high; the whole plant of a greyish-white, with a very close almost silky down. Leaves almost orbicular in their general outline, but much cut into oblong-linear, obtuse lobes. Flower-heads numerous, drooping, nearly hemispherical, and larger than in the other British species; the outer bracts narrow-linear, the inner ones very broad. Central florets numerous and mostly fertile; the outer female ones small and often barren.

On roadsides and waste places, over the greater part of Europe and Russian Asia, but in many cases introduced only, having been formerly much cultivated for its bitter qualities. In Britain it ap-

pears truly indigenous near the sea in many parts of England and southern Scotland; in the interior it is confined to the neighbourhood of villages and habitations. *Fl. autumn.*

XVI. **CUDWEED.** GNAPHALIUM.

Herbs, more or less covered with a grey or white, cottony wool; the leaves narrow and entire. Flower-heads small, sessile, often clustered, rarely forming terminal corymbs. Involucral bracts imbricated, cottony outside, and more or less dry, scarious, and often coloured at the tips. Receptacle small, without scales. Florets of the centre tubular, but often barren; those of the circumference filiform and female, or the two kinds separated in different heads. Anthers with minute bristles or hair-like points at their base. Style of *Senecio*. Achenes with a pappus of simple hairs.

If taken in its integrity, this genus is one of the most extensive among *Composites*, and the widest-diffused over the globe. It has been,

however, subdivided into a very large number of small genera upon minute characters, the natural value of which is scarcely yet satisfactorily established. The most marked of them applicable to the British species, and which may be considered at any rate as sections, are the following:—1. *ANTENNARIA*; flower-heads diœcious, comprising the *diœcious C.* and the *pearl C.* 2. *MEROPE*; hairs of the pappus combined in a ring at the base; the *wood C.* and the *dwarf C.* 3. *FILAGO*; receptacle bearing a row of scales between the outer and the next row of florets; the *common C.*, *narrow C.*, and *least C.* Leaving in 4, *GNAPHALIUM*, the somewhat dissimilar *Jersey C.* and *marsh C.*

Most of the *Composite Everlastings* of our gardens belong to the allied genus *Helichrysum*, of which no species are British.

Inner bracts of the involucre pure-white at the tips. Flower-heads almost diœcious, in terminal corymbs.

Low plant, with 3 to 6 heads in the corymb 1. *Mountain C.*

Tall plant, with a large corymb of numerous heads 2. *Pearl C.*

Inner bracts of the involucre brown or pale at the tips.

Flower-heads in clusters or rarely solitary, including both kinds of florets.

Perennials. Flower-heads in leafy spikes, or terminal and few.

Flower-heads in oblong or elongated leafy spikes. Outer filiform florets numerous. Achenes not flattened 4. *Wood C.*

Flower-heads solitary or very few, on a dwarf stem.

Outer filiform florets few. Achenes flattened 5. *Dwarf C.*

Flower-heads densely clustered, terminal, almost corymbose. Outer filiform florets numerous. Achenes not flattened 3. *Jersey C.*

Annuals. Flower-heads small, numerous, in lateral or terminal clusters.

Clusters terminal, surrounded by leaves much longer than the heads.

Florets very numerous, all within the involucre without intervening scales 6. *Marsh C.*

Outer filiform florets separated by scales of the receptacle, outermost of all embraced by the inner involucre bracts 9. *Narrow C.*

Clusters terminal or lateral; the surrounding leaves shorter or scarcely longer.

Involucres very small, in very dense clusters, with a row of scales on the receptacle within the outer row of florets.

Clusters few, globular, and terminal, with numerous heads 7. *Common C.*

Clusters numerous, lateral and terminal, with less than 10 heads.

- Leaves linear-lanceolate 8. *Field C.*
 Leaves linear-subulate 9. *Narrow C.*
 Involucres loosely clustered, 2 or 3 lines diameter.
 Florets all within the inner bracts of the involucre 3. *Jersey C.*

1. Mountain Cudweed. *Gnaphalium dioicum*, Linn.

(Fig. 522.)

(Eng. Bot. t. 267. *Antennaria*, Brit. Fl. *A. hyperborea*, Eng. Bot. Suppl. t. 2640. *Mountain Everlasting*, or *Cat's-ear*.)

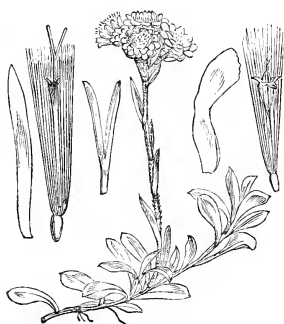


Fig. 522.

A small perennial, with a tufted or creeping leafy stalk, and almost simple flowering stems, 2 to 4 or 5 inches high. Lower leaves obovate or oblong; upper ones linear, white underneath or on both sides. Flower-heads 3 or 4 together, in compact, terminal corymbs, and diœcious. In the males the inner bracts of the involucre have broad, white, petal-like tips, spreading like the ligulate florets of a radiating flower-head; the florets all tubular and short. In the females the inner bracts are narrow, white at the tips, but not spreading, and the florets all filiform, with a long pro-

truding pappus to the achenes.

In mountain pastures, common in northern Europe, Asia, and America, to the Arctic regions, and in the great mountain-ranges of central and southern Europe and Russian Asia. Abundant in Scotland, Wales, Ireland and many parts of England, descending occasionally nearly to the coast level. *Fl. summer, rather early.*

2. Pearl Cudweed. *Gnaphalium margaritaceum*, Linn.

(Fig. 523.)

(Eng. Bot. t. 2018. *Antennaria*, Brit. Fl.)

An erect perennial, 2 to 3 feet high. Leaves linear-lanceolate, white and cottony underneath or on both sides. Flower-heads numerous, in flat terminal corymbs, usually diœcious, but less absolutely so than in the *mountain C.*; the involucre of both kinds with several rows of very white, broad, loose or spreading bracts.

A North American and central Asiatic plant, long cultivated among our garden *Everlastings*, and now apparently naturalized in a few localities in Monmouthshire and in South Wales, *Fl. end of summer*.



Fig. 523.

3. Jersey Cudweed. *Gnaphalium luteo-album*, Linn.
(Fig. 524.)

(Eng. Bot. t. 1002.)

An annual or biennial, scarcely a foot high; the stems erect or ascending, and all covered with soft, white cotton. Leaves narrow. Flower-heads 2 or 3 lines in diameter, irregularly clustered in a dense corymb. Involucral scales scarious at the top, of a pale-brown, yellow, or dirty-white colour, but not spreading. Florets very numerous, mostly female and filiform, with a few tubular male or complete ones in the centre.

In sandy fields, pastures, and waste places, dispersed nearly all over the temperate and warmer regions of the globe, extending in Europe to the Baltic, but not beyond. In the British Isles, hitherto confined to Jersey. *Fl. summer and autumn*.

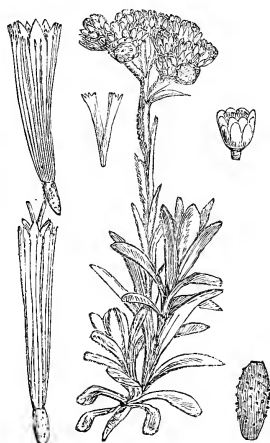


Fig. 524.

4. Wood Cudweed. *Gnaphalium sylvaticum*, Linn.

(Fig. 525.)

(Eng. Bot. t. 913. *G. rectum*, Eng. Bot. t. 124.)

Fig. 525.

Stock perennial, tufted or shortly creeping, with long-stalked, lanceolate leaves. Flowering stems nearly simple, erect, from 2 to 6 or 8 inches high, with linear leaves, usually cottony on the under side only, but sometimes on both sides. Flower-heads small, cylindrical or ovoid, either solitary or in little clusters in the axils of the upper leaves, forming a long, leafy spike. Involucres scarcely cottony, with brown, shining bracts; the outer filiform florets more numerous than the inner tubular ones. Achenes slender, nearly cylindrical.

In open woods, heaths, and pastures, in northern and central Europe and Russian Asia, and all round the Arctic Circle; becoming a mountain plant in the south, and scarcely reaching the

Mediterranean. Extends over the whole of Britain, but rare in south-western England. *Fl. summer and autumn.* A high alpine or Arctic variety, with the leaves cottony on both sides, and the flower-heads darker coloured, in a short terminal spike, has been distinguished under the name of *G. norvegicum* or *fuscatum*, and has been found on some of the Scotch mountains.

5. Dwarf Cudweed. *Gnaphalium supinum*, Linn.

(Fig. 526.)

(Eng. Bot. t. 1193, *unusually luxuriant.*)

A small, tufted perennial, with narrow leaves, sometimes resembling dwarf specimens of the *wood C.*, but the stem seldom 2 inches high, bearing only very few flower-heads in a terminal cluster, or only a single one; and sometimes the flower-heads are almost sessile in the centre of the radical leaves. Involucres brown, like those of the *wood*

C., but the filiform florets are much fewer, and the achenes broader and evidently flattened.

An Arctic and high alpine plant, extending over the principal mountain-ranges of Europe and western Asia to the Arctic Circle. Not uncommon in the Scotch Highlands. *Fl. summer.*

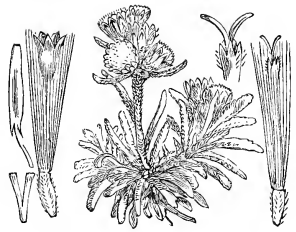


Fig. 526.

6. Marsh Cudweed. *Gnaphalium uliginosum*, Linn.
(Fig. 527.)

(Eng. Bot. t. 1194. *Cudweed*.)

A much branched, cottony annual, seldom above 6 inches high; the leaves linear or narrow-oblong, the upper ones waved on the edges. Flower-heads small and clustered, many together, within a tuft of rather long leaves at the extremity of the branches. Involucral bracts brown and scarious. Florets about the length of the involucre, the 3 or 4 outer rows filiform, with a very few tubular ones in the centre. Achenes very minute, scarcely compressed, with a very deciduous pappus of distinct hairs.

In fields and waste places, especially in wet, sandy situations, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Common in Britain. *Fl. summer and autumn.*



Fig. 527.

7. Common Cudweed. *Gnaphalium germanicum*, Willd.
(Fig. 528.)

(Eng. Bot. t. 946. *Filago*, Brit. Fl. *F. apiculata*, and *F. spathulata*, Bab. Man. *Cudweed*.)

An erect, cottony annual, about 6 or 8 inches high, simple or branched at the base; each stem terminated either by a single globular cluster of flower-heads, or throwing out immediately under it 2

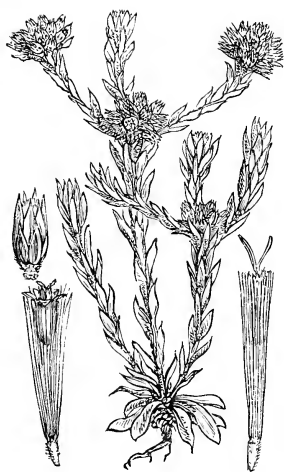


Fig. 528.

or 3 branches, each ending in a similar cluster. Leaves erect, lanceolate or linear, pointed or obtuse, sometimes slightly spatulate; those under the clusters shorter or rather longer than the clusters themselves. Flower-heads very small, about 12 to 20 or 30 in each cluster; the involucre ovoid-conical, more or less angular, of a pale-yellow or brown; the bracts usually acute. Florets shorter than the involucre; the outer filiform ones mostly concealed among the scales of the receptacle (or inner bracts of the involucre), with a few, chiefly tubular, in the centre, without scales.

In dry pastures, and stony or sandy wastes, over the whole of Europe and western Asia except the extreme north. Abundant in England, rather less so in Scotland. *Fl. the whole summer*. It has been subdivided into several sup-

posed species, upon characters derived from the shorter or longer, and more or less obtuse or acute floral leaves, from the quantity of cotton on the involucre, and from their obtuse or acute bracts.

8. Field Cudweed. *Gnaphalium arvense*, Willd. (Fig. 529.)

(*G. minimum*, Eng. Bot. t. 1157. *Filago minima*, Brit. Fl.)

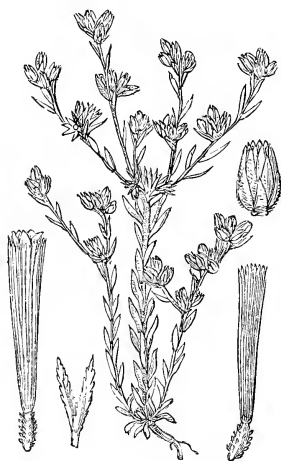


Fig. 529.

A much more slender and smaller annual than the *common C.*, which it otherwise resembles in foliage and mode of growth. It is more irregularly branched at the top, the leaves smaller, the clusters of flower-heads smaller and more numerous, each consisting of from 3 to 10 minute conical heads. Involucre cottony at the base, shining at the tips, and only one or two outer rows of filiform florets are amongst the scales of the receptacle.

In fields, and stony or sandy wastes, with a wider range than that of the *common C.*, extending all across Russian Asia, and more common in the north, although not an Arctic plant. In Britain, it has been observed in a few localities

in England, Ireland, and southern Scotland, but perhaps frequently overlooked owing to its small size. *Fl. the whole summer.*

9. Narrow Cudweed. *Gnaphalium gallicum*, Huds.
(Fig. 530.)

(Eng. Bot. t. 2369. *Filago*, Brit. Fl.)

Very near the *field C.*, but much more branched, the leaves almost subulate and much longer, the clusters of flower-heads very numerous and small, the leaves which surround them longer than the involucre, whilst in the last two they are mostly shorter. Involucres very small and conical, containing but very few florets. Some of the outermost row are embraced as it were each by one of the inner bracts of the involucre, with a row of receptacular scales between them and the next row, thus distinguishing this species from small specimens of the *marsh C.*, which it sometimes resembles.

In fields and sandy wastes, in western and southern Europe, becoming rare in Germany. Very local in Britain, having been chiefly recorded from some of the eastern counties of England. *Fl. summer.*

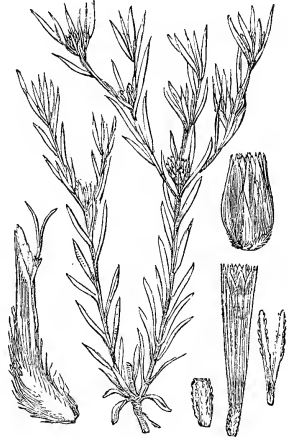


Fig. 530.

XVII. *SENECIO*. *SENECIO*.

Herbs (or, in some exotic species, shrubs), with alternate, toothed or divided, rarely entire leaves. Flower-heads in terminal corymbs; the florets of the disk yellow and tubular, those of the ray also yellow (or, in some exotic species, blue, purple, or white), spreading, or rarely wanting. Involucre cylindrical or nearly hemispherical, with 1 or 2 rows of linear bracts of equal length, often tipped with brown, usually, but not always, accompanied by a few small outer bracts at their base. Receptacle without scales. Achenes cylindrical, with a pappus of simple hairs, usually soft and white. Branches of the style truncate at the top, usually with a tuft of minute hairs.

This, the largest of all *Composite* genera, is spread over every quarter of the globe, although the majority of species occupy each a small area. Several species which have not the small outer bracts to the involucre, were distinguished by Linnæus under the name of *Cineraria*, but the character has proved so uncertain that modern botanists have given it up.

Leaves cut or divided.

Florets of the ray very small and rolled back, or entirely wanting. Root annual.

Ray none. Flower-heads almost sessile, in dense corymbs or clusters 1. *Groundsel S.*

Ray small and rolled back or rarely wanting. Flower-heads stalked, in loose corymbs.

Whole plant very viscid. Involucres broadly cylindrical, of about 20 bracts, with 2 or 3 short outer ones. Achenes glabrous 2. *Viscous S.*

Plant rarely viscid. Involucres narrow, of about 12 to 14 bracts; the outer ones scarcely perceptible.

Achenes silky 3. *Wood S.*

Florets of the ray conspicuous and spreading.

Root annual.

Achenes with short silky hairs 4. *Squalid S.*

Achenes quite glabrous 5. *Water S.*

Rootstock perennial.

Branches spreading. Corymb loose and irregular.

Achenes all glabrous 5. *Water S.*

Stem tall and erect. Corymb rather dense, and terminal. Achenes of the disk hairy.

Leaves irregularly pinnate, with a broad terminal lobe. Achenes of the ray glabrous. Rootstock not creeping 6. *Ragwort S.*

Leaves pinnate; the lobes all narrow. Achenes all hairy. Rootstock shortly creeping . . . 7. *Narrow-leaved S.*

Leaves undivided, entire or toothed.

Involucres with small, fine outer bracts at the base.

Leaves acutely toothed.

Leaves cottony underneath. Ray of 12 to 20 florets 8. *Fen S.*

Leaves glabrous. Ray of 5 to 8 florets 9. *Broad-leaved S.*

Involucres of a single row of bracts, without small outer ones. Leaves entire or obtusely toothed.

Annual or biennial. Leaves downy. Achenes glabrous, strongly ribbed. 10. *Marsh S.*

Rootstock perennial. Leaves loosely cottony underneath. Achenes cottony; the ribs scarcely prominent 11. *Field S.*

Several exotic species are much cultivated for ornament, especially

the double-flowering *S. elegans* from the Cape, the *S. Cineraria* from the shores of the Mediterranean, and the numerous varieties of one or two Canary Island species, known to our gardeners as greenhouse *Cinerarias*. The *S. saracenicus*, a tall perennial, from central and eastern Europe, with narrow undivided leaves, is said to be perfectly naturalized near Stradbally, Queen's County, Ireland.

1. **Groundsel Senecio.** *Senecio vulgaris*, Linn. (Fig. 531.)

(Eng. Bot. t. 747. *Groundsel*.)

An erect, branching annual, from 6 inches to near a foot high, glabrous or bearing a little loose, cottony wool. Leaves pinnatifid, with ovate, toothed or jagged lobes. Flower-heads in close terminal corymbs or clusters. Involucres cylindrical, of about 20 equal bracts, with several outer smaller ones. Florets almost always all tubular, without any ray whatever. Achenes slightly hairy.

A very common weed of cultivation throughout Europe and Russian Asia, but not extending into the tropics, and less disposed than many others to migrate with man. Abundant in Britain. *Fl. all the year round.*

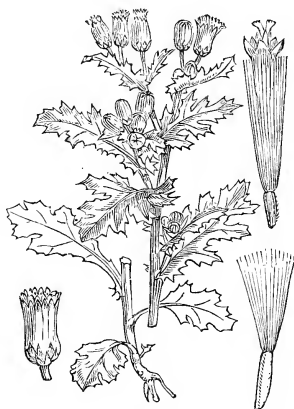


Fig. 531.

2. **Viscous Senecio.** *Senecio viscosus*, Linn. (Fig. 532.)

(Eng. Bot. t. 32, *the ray rather too large*, and *S. lividus*, Eng. Bot. t. 2515 ?)

A coarser, harder, and taller annual than the *Groundsel S.*, and covered all over with a short, viscous, strong-smelling down, the leaves more deeply divided, with narrower, more jagged lobes, the flower-heads rather thicker, with more florets, and on longer peduncles, forming a loose, terminal corymb. Outer scales of the involucre usually but 2 or 3, and nearly half as long as the inner ones, of which there are about 20. Outer florets ligulate, but small, and rolled back so as at first sight to escape observation. Achenes glabrous.

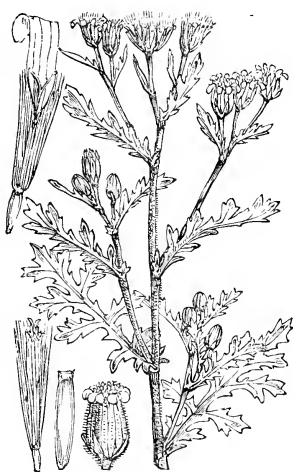


Fig. 532.

In waste places, over a great part of Europe, but not common, and does not extend so far eastward or northward as the *Groundsel S.* Scattered over various parts of England, southern Scotland, and Ireland, but very local, and seldom abundant. *Fl. summer and autumn.*

3. Wood Senecio. *Senecio sylvaticus*, Linn. (Fig. 533.)

(Eng. Bot. t. 748.)

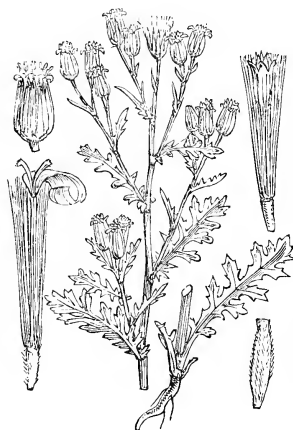


Fig. 533.

An annual, with the foliage much like that of the *Groundsel S.*, but a taller and weaker plant, sometimes 2 feet high or more, slightly downy, or nearly glabrous, not so viscid nor so strong-smelling as the *viscous S.* Flower-heads rather numerous, in a loose corymb, the involucre cylindrical, of from 12 to 15 equal bracts, with the outer ones very minute or wanting. Outer florets usually ligulate, but small and rolled back as in the *viscous S.*, and sometimes altogether wanting, as in the *Groundsel S.* Achenes covered with minute, appressed hairs.

On banks, waste places, and borders of woods, in temperate and southern Europe, from Scandinavia to the Mediterranean. Found occasionally in most parts of Britain, but not generally com-

mon. *Fl. summer and autumn.*

4. Squalid Senecio. *Senecio squalidus*, Linn. (Fig. 534.)

(Eng. Bot. t. 600.)

An annual or biennial, or even sometimes forming a stock of two or three years' duration, with the stature of the *Groundsel S.*, but quite glabrous. Leaves rather thick, pinnatifid, with narrow, deeply-cut, or jagged lobes. Flower-heads rather large, in a loose corymb, with a bright-yellow, spreading ray, as conspicuous as in the *Ragwort S.* Achenes silky-hairy.

A south European species, said to be quite established on walls at Oxford, Bideford, Cork, and a few other localities in southern England and Ireland, but evidently not indigenous. *Fl. summer and autumn.*



Fig. 534.

5. Water Senecio. *Senecio aquaticus*, Huds. (Fig. 535.)

(Eng. Bot. t. 1131.)

Not always easy to distinguish from the *Ragwort S.*, especially from occasional autumnal offsets of the latter, when the main stem has been accidentally destroyed. The foliage is nearly the same, but the plant appears to be of shorter duration, the stem not so tall, seldom attaining 2 feet, more branched and spreading, the flower-heads larger, fewer, on longer peduncles, forming a loose, irregular, spreading corymb, and especially the achenes appear to be always quite glabrous.

In wet places, along ditches, etc., spread almost all over Europe, extending northward to southern Scandinavia. Common in Britain. *Fl. summer.*



Fig. 535.

6. Ragwort Senecio. *Senecio Jacobæa*, Linn. (Fig. 536.)(Eng. Bot. t. 1130, *not good*.)

Fig. 536.

Rootstock short and thick, without creeping shoots. Stems 2 to 4 feet high, erect, scarcely branched except at the top. Leaves pinnate, with ovate, obovate, or narrow segments, coarsely toothed or pinnatifid, the terminal ones large and confluent, the lower ones smaller and distinct, all glabrous, or with a loose, woolly down, especially on the under side. Flower-heads rather large, of a bright-yellow, in a handsome, compact terminal corymb. Involucral bracts tipped with black, the outer ones few, and very small. Florets of the ray from 12 to 15, linear-oblong and spreading. Achenes of the disk covered with short hairs, those of the ray glabrous.

On roadsides, in waste places, and bushy pastures, all over Europe and Russian Asia, except the extreme north. Very common in Britain. *Fl. summer, lasting*

till late. When eaten down, or checked in its growth, it will often assume the spreading inflorescence of the *water S.*, when it can only be distinguished by inspection of the achenes.

7. Narrow-leaved Senecio. *Senecio erucæfolius*, Linn.

(Fig. 537.)

(*S. tenuifolius*, Eng. Bot. 574.)

Very near the *Ragwort S.*, but appears everywhere distinct. It is fully as tall, and has the same inflorescence and flower-heads, but the rootstock is shortly creeping, the leaves are much more regularly divided into narrower segments, the terminal ones not very different from the others, and the achenes of the ray as hairy as those of the disk. The whole plant is generally more or less covered with a loose cottony down.

The geographical area and stations are about the same as those of the *Ragwort S.* It is rather more common in central and southern Europe, but rather less so in Britain, and in the north generally. *Fl. summer and autumn.*

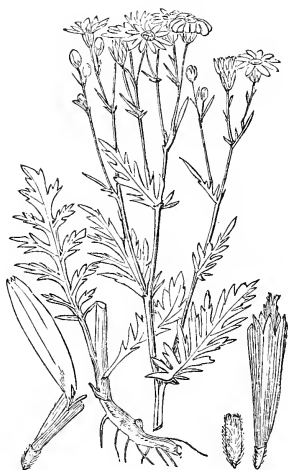


Fig. 537.

8. Fen Senecio. *Senecio paludosus*, Linn. (Fig. 538.)

(Eng. Bot. t. 650.)

Stem erect, 2 to 5 or 6 feet high, scarcely branched. Leaves numerous, narrow-lanceolate, sharply toothed, more or less cottony on the under side. Flower-heads rather large, not very numerous, in a loose terminal corymb. Involucres almost hemispherical, the outer bracts few, short, and subulate. Florets of the ray from 12 to 16, yellow, linear and spreading.

In swamps and fens, in temperate Europe, extending northward to southern Sweden, but usually very local. In Britain, restricted to the fenland tracts in the eastern counties of England. *Fl. summer.*



Fig. 538.

9. Broad-leaved Senecio. *Senecio saracenicus*, Linn.
(Fig. 539.)

(Eng. Bot. t. 2211.)



Fig. 539.

An erect perennial, nearly allied to the *fen S.*, but glabrous or nearly so, and not usually so tall. Leaves broadly or narrowly lanceolate, and more regularly toothed. Flower-heads much more numerous, and smaller than in the *fen S.*, in a compact corymb. Involucres cylindrical or ovoid, with seldom more than 6 or 7 florets to the ray.

In woods and shady places, almost all over the continent of Europe, extending in Russian Asia to the Arctic regions, although not found in Scandinavia. Very local in Britain, and chiefly in moist meadows and pastures in various parts of England, possibly escaped from gardens where it has been sometimes cultivated. In Ireland, in woods near Bantry. *Fl. summer.*

10. Marsh Senecio. *Senecio palustris*, DC. (Fig. 540.)

(*Cineraria*. Eng. Bot. t. 151.)



Fig. 540.

An erect and nearly simple annual or biennial, often covered with a loose, grey down, not cottony as in the *field S.* Stem hollow, 1 to 2 feet high. Leaves lanceolate, sinuate and coarsely toothed or nearly entire. Flower-heads in a dense terminal corymb, approaching to an umbel. Involucral bracts all equal, without any small outer ones. Florets of the ray about 20, yellow. Achenes glabrous, strongly ribbed, with a copious, silky pappus more than twice as long as the involucre.

In wet, muddy places, in northern Europe and Asia, from the Arctic regions to Picardy, the Netherlands, and central Germany. Rare in Britain, and apparently confined to the eastern counties of England. *Fl. summer.*

11. Field Senecio. *Senecio campestris*, DC. (Fig. 541.)

(Cineraria integrifolia, Eng. Bot. t. 152.)

Rootstock short and thick, or slightly creeping. Stem erect, simple, from a few inches to 1 or 2 feet high. Radical leaves stalked, oblong or ovate, those of the stem longer and narrower, upper ones few and distant, all entire or toothed, with a loose, cottony wool on the under side, as also on the stems, especially in open dry situations. Flower-heads like those of the *marsh S.*, but only few together, in a small terminal corymb or rather umbel, the peduncles starting from nearly the same point. Achenes downy, with scarcely prominent ribs, and a shorter pappus than in the *marsh S.*

In meadows and pastures, in most of the mountain-ranges of Europe and Russian Asia to the Arctic regions. In Britain, limited to a few stations on the chalky downs of the central and southern counties of England, and to the maritime rocks near Holyhead. *Fl. summer.*

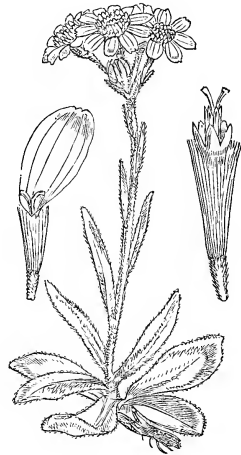


Fig. 541.

XVIII. **DORONIC.** DORONICUM.

Herbs, with perennial, often creeping stocks, long-stalked, broad radical leaves, and erect flower-stems, bearing a few undivided, alternate leaves, and one, or but few, rather large, yellow, radiating flower-heads. Involucres hemispherical, with linear bracts of equal length. Achenes and florets of *Senecio*, except that the achenes of the ray have no pappus.

A small genus, extending over central and southern Europe and western Asia, but chiefly restricted to mountain districts.

Radical leaves deeply cordate. Stems usually with 3 to

5 flower-heads 1. *Great D.*

Radical leaves narrowed or rounded at the base. Stems

usually with 1 flower-head 2. *Plantain D.*

1. Great Doronic. *Doronicum Pardalianches*, Linn.
(Fig. 542.)

(Eng. Bot. Suppl. t. 2654. *Leopard's-bane*.)



Fig. 542.

Rootstock more or less creeping, often woolly at the crown. Radical leaves broadly ovate and deeply cordate at the base. Stems about 2 feet high, with but few leaves, mostly ovate; the lower ones stalked, but embracing the stem by a broader dilated base; the upper ones small, sessile or embracing the stem. Flower-heads generally 3 to 5, on long, leafless peduncles; the yellow rays numerous, and narrow.

In woods and mountain pastures, in central Europe, frequently cultivated in cottage gardens, and readily spreads in their vicinity. In Britain, only as an out-cast from gardens, but apparently well established in several parts of England and southern Scotland. *Fl. spring and early summer.*

2. Plantain Doronic. *Doronicum plantagineum*, Linn.
(Fig. 543.)



Fig. 543.

Differs from the *great D.* chiefly in the radical leaves, which are never cordate, usually narrowed or wedge-shaped at the base, and rather strongly marked with 3 or 5 ribs; the stem-leaves narrower than in the *great D.*; and the flower-head solitary on a long terminal peduncle, or very rarely, when very luxuriant, the stem bears 2 or 3 heads.

In open, sandy woods, in central and southern Europe, from the Atlantic to the eastern frontier, extending in France considerably to the northward of Paris. In Britain, like the last species, only as an escape from cultivation. *Fl. spring and early summer.* Both the species vary, either glabrous or hairy, and with their leaves entire or irregularly toothed.

XIX. **BIDENS.** BIDENS.

Glabrous herbs, with opposite leaves, and hemispherical heads of yellow flowers. Involucres of 2 or 3 rows of bracts, the outer ones often longer and leafy. Florets either all tubular, or the outer ones ligulate and radiating. Receptacle with chaffy scales between the florets. Achenes flattened, crowned by 2 or 3 (very rarely 4 or 5) short, stiff bristles or awns, which are rough with minute deflexed prickles.

A genus not very numerous in species, but diffused over the whole surface of the globe, some species being among the commonest tropical weeds, whilst others extend into the Arctic Circle.

- Leaves undivided 1. *Nodding B.*
 Leaves deeply cut into 3 or 5 segments 2. *Three-cleft B.*

1. **Nodding Bidens.** *Bidens cernua*, Linn. (Fig. 544.)

(Eng. Bot. t. 1114. *Bur-Marigold*.)

A rather stout, erect annual, 1 to 2 feet high, with spreading branches. Leaves lanceolate and serrate, but not divided. Flower-heads drooping, on terminal peduncles from $\frac{1}{2}$ an inch to an inch diameter; the florets usually all tubular, but occasionally a few of the outer ones become ligulate. Inner bracts of the involucre broad, and often shining, and yellow on their edges; outer ones more leafy, and often much longer, and spreading. Awns of the achenes usually 2 or 3, very rarely 4.

In wet ditches and marshes, throughout the temperate and northern regions of Europe, Asia, and America. Common in England and southern Scotland. *Fl. summer and autumn.*



Fig. 544.

2. **Three-cleft Bidens.** *Bidens tripartita*, Linn.

(Fig. 545.)

(Eng. Bot. t. 1113.)

Only differs from the *Nodding B.* in the leaves, which are deeply



Fig. 545.

cut into 3 or 5 lanceolate segments, and in the flower-heads rather less drooping.

Its geographical range and stations are the same as those of the *drooping B.*, but it appears to be rather less common in Britain. *Fl. summer and autumn.*

XX. BURWEED. XANTHIUM.

Coarse annuals, with alternate leaves, and unisexual, axillary or terminal heads of green flowers. Involucre of the males of several bracts in a single row, enclosing many tubular florets, separated by the scales of the receptacle. Anthers free. Female florets 2 together, combined with the involucre into an ovoid or oblong, prickly burr, terminating in 2 beaks, from which the stigmas shortly protrude.

A genus of two or perhaps three species, from the Mediterranean region to the Levant, but spread as weeds of cultivation over a great part of the globe. Its immediate connection with the remainder of *Compositae* can only be traced through several exotic genera forming the small tribe of *Ambrosiæ*, the general habit and unisexual flowers showing at first sight some analogy to the *Nettle* family, and some other *Monochlamyds*.

1. Broad Burweed. *Xanthium Strumarium*, Linn. (Fig. 546.)

(Eng. Bot. t. 2544.)

A coarse, erect annual, 1 to 2 feet high. Leaves on long stalks, rather large, broadly heart-shaped, coarsely toothed or angular, rough

on both sides. Flower-heads in axillary clusters, or short terminal racemes; the upper ones male; the lower female heads forming, when in fruit, ovoid burrs, about 6 to 8 lines long, covered with hooked prickles; the stout, short, conical beaks, erect or turned inwards.

In cultivated and waste places, throughout central and southern Europe and central Asia, extending, as a weed of cultivation, northwards to the Baltic, as well as into many other parts of the globe. Has been occasionally found in some of the southern counties of England and Ireland, but is not a truly British plant. *Fl. summer.*



Fig. 543.

XXI. **BURDOCK.** ARCTIUM.

A single species, distinguished as a genus from *Thistles* by the foliage, by the bracts of the involucre ending in a long, stiff point hooked at the extremity, and by the short, stiff pappus.

1. **Common Burdock.** *Arctium Lappa*, Linn. (Fig. 547.)

(Eng. Bot. t. 1228. *A. Bardana*, Eng. Bot. t. 2478.)

A stout, branching, erect biennial, 3 to 5 feet high, the lower heart-shaped leaves very large, sometimes attaining $1\frac{1}{2}$ feet in length by a foot in breadth; the upper ones much smaller, and broadly ovate; all green, and nearly glabrous above, often covered with a short, white, cottony down underneath, bordered by minute teeth, but not prickly. Flower-heads in terminal panicles. Involucres nearly globular, glabrous or covered with a loose, white, cottony wool, catching at anything they come in contact with by the hooked points of their numerous bracts. Florets purple, all equal. Anthers with hair-like appendages at their base. Achenes large, with a short pappus of stiff hairs.

In waste places, on roadsides, etc., over all Europe and Russian Asia, except the extreme north, and naturalized in other parts of the globe. Common in Britain. *Fl. summer.* It varies much in the size of the



Fig. 547.

flower-heads (from $\frac{3}{4}$ to $1\frac{1}{2}$ inches diameter), in the breadth of the involucre bracts, in the abundance or deficiency of the cottony wool, in the length of the peduncles; and botanists have attempted to establish as many as five species,* but no certain limits can be ascribed even to the three more generally recognized varieties, the *large-headed*, the *small-headed*, and the *cottony Burdocks*.

XXII. SAWWORT. SERRATULA.

Herbs, not prickly, but with the general habit and style of the *Thistleheads*. Involucres ovoid or oblong, the bracts imbricated and pointed, but not prickly. Receptacle with chaffy bristles between the florets. Pappus of numerous simple and unequal hairs, longer than the achenes. Anthers without appendages.

Although much reduced by the modern splitting of genera, *Sawwort* still includes several south European and Asiatic species.

1. Common Sawwort. *Serratula tinctoria*, Linn. (Fig. 548.)

(Eng. Bot. t. 38.)

A stiff, erect, scarcely branched, and nearly glabrous perennial, 1 to 3 feet high; the lower leaves more or less pinnate, with lanceolate, pointed, and finely toothed segments, the terminal one the largest; the upper leaves toothed only, or with a few lobes at their base. Flower-heads in a terminal corymb, partially dioecious, the male heads rather stouter than the females. Involucres 7 or 8 lines long, with numerous appressed bracts, the inner ones often coloured at the tips. Florets purple.

* See Babington's 'Manual,' ed. 4, pp. 184 and 185.

In open woods, thickets and bushy pastures, common throughout temperate Europe, and extending far into Scandinavia, but not indicated in Asiatic Floras. Spread over nearly the whole of England, but scarcely penetrates into Scotland, and not recorded from Ireland. *Fl. late in summer.*

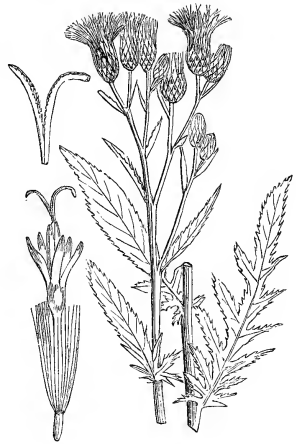


Fig. 548.

XXIII. **SAUSSUREA.** SAUSSUREA.

Herbs, with the habit and characters of *Sawwort*, except that the hairs of the pappus, or at least the inner ones, are very feathery, and the anthers have at their lower end hair-like appendages or *tails*.

The species are chiefly numerous in central and Russian Asia. There are but few in Europe, confined to mountain regions or high northern latitudes.

1. **Alpine Saussurea.** *Saussurea alpina*, DC. (Fig. 549.)

(*Serratula*, Eng. Bot. t. 599.)

Stem erect and simple, seldom a foot high, covered, as well as the involucre and under side of the leaves, with a loose cotton, which wears off with age. Leaves from ovate to lanceolate, entire or toothed, 2 to 3 inches long. Flower-heads ovoid or oblong, nearly sessile, in a small, dense terminal corymb, with purple florets. The soft, feathery pappus projects beyond the involucre, the inner bracts of which are softly hairy.



Fig. 549.

In high northern latitudes, or at considerable elevations in the mountain-ranges of Europe, Russian Asia, and Arctic America. Frequent in the Highlands of Scotland, and found also in North Wales, in the Lake district of northern England, and in Kerry county, Ireland.

XXIV. **THISTLE.** CARDUUS.

Herbs, with hard stems. Leaves often cut, and usually very prickly. Involucres globular or ovoid, the bracts numerous, closely imbricated, and usually prickly. Receptacle thick, bearing bristles between the florets. Florets all equal and tubular. Achenes glabrous, with a pappus of numerous simple or feathery hairs longer than the achene itself.

The largest and widest-spread genus among *Thistle-heads*, for although the species are chiefly European and Asiatic, yet there are also several from North America, and the common ones accommodate themselves readily even to a tropical climate. They are usually divided into two genera, the *plume Thistles* (*Cirsium* or *Cnicus*) with a feathery pappus, and the *true Thistles* with a simple-haired pappus, but the distinction is so purely artificial that several botanists now revert to the old natural limits indicated by Linnæus.

Pappus consisting of simple hairs (TRUE THISTLES).

Bracts of the large involucre very broad at the base,
with lateral as well as terminal prickles 1. *Milk T.*

Bracts of the involucre lanceolate or linear, without
lateral prickles.

Involucres globular, large.

Involucral bracts broadly lanceolate 2. *Musk T.*

- Involucral bracts linear 3. *Wetted T.*
 Involucres ovoid or cylindrical 4. *Slender T.*
 Pappus consisting of feathery hairs (PLUME THISTLES).
Leaves decurrent along the stem, forming prickly wings.
 Flower-heads all peduncled.
 Flower-heads few, near 1½ inches long. Stem winged
 and prickly. Root biennial 5. *Spear T.*
 Flower-heads not an inch long, in terminal corymbs.
 Leaves but little decurrent. Rootstalk creep-
 ing 7. *Creeping T.*
 Flower-heads small, in dense clusters. Stem winged
 and prickly 6. *Marsh T.*
Leaves not decurrent, or only very shortly so.
 Flower-heads sessile or on very short peduncles.
 Stems stout and branched (about 2 feet). Invo-
 lucres large and cottony 8. *Woolly T.*
 Stems dwarf, or scarcely any. Involucres not
 cottony 12. *Dwarf T.*
 Flower-heads all peduncled. Rootstock perennial,
 often creeping.
 Flower-heads in terminal corymbs 7. *Creeping T.*
 Flower-heads growing singly on long peduncles.
 Leaves ciliate, not prickly, very white underneath 9. *Melancholy T.*
 Leaves prickly, green, or with a loose white cotton
 underneath.
 Leaves deeply pinnatifid and lobed. Flower-heads
 usually 2 to 4 10. *Tuberous T.*
 Leaves toothed, sinuate, or shortly lobed.
 Flower-heads usually solitary or 2 only . . 11. *Meadow T.*

Very anomalous specimens occur occasionally, especially among the *Plume Thistles*, which are generally believed to be natural hybrids.

1. Milk Thistle. *Carduus Marianus*, Linn. (Fig. 550.)

(Eng. Bot. t. 976. *Silybum*, Bab. Man.)

An annual or biennial, 2 to 3 feet high, not much branched, and glabrous or with but very little cottony wool. Leaves smooth and shining above, and variegated by white veins; the lower ones deeply pinnatifid with broad very prickly lobes; the upper ones clasping the stem by prickly auricles but scarcely decurrent. Flower-heads large, drooping, solitary at the ends of the branches, with purple florets. Bracts of the involucre very broad at the base, with a stiff, spreading,



Fig. 550.

leafy appendage, ending in a long prickle, and bordered with prickles at its base. Hairs of the pappus simple.

In waste places, in southern Europe to the Caucasus; not indigenous in central Europe, although it occurs here and there as a weed of cultivation. Rare and probably only introduced into Britain. *Fl. summer.*

2. Musk Thistle. *Carduus nutans*, Linn. (Fig. 551.)

(Eng. Bot. t. 1112.)

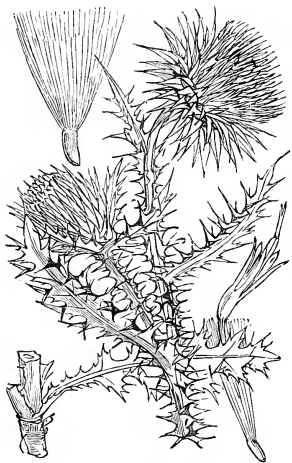


Fig. 551.

A stout species, 2 to 3 feet high, usually slightly covered with loose cottony hairs. Leaves deeply pinnatifid, very prickly, their edges decurrent along the stem, forming narrow, very prickly wings. Flower-heads large and drooping, as in the *milk T.*, but often 3 or 4 in a loose corymb. Involucral bracts numerous, with a stiff, narrow-lanceolate appendage, ending in a spreading or reflexed prickle, but without lateral prickles. Hairs of the pappus simple.

In waste places, common in the greater part of Europe and temperate Asia, but not spreading to the extreme north. Pretty frequent in southern England, especially on limestone soils, less so in the north, and rare in Scotland. Occurs also in Ireland. *Fl. summer.*

3. Welshed Thistle. *Carduus acanthoides*, Linn. (Fig. 552.)

(Eng. Bot. t. 973.)

Much resembles the *muske T.*, but is usually taller and rather more branched; the leaves narrower and more prickly; and the stem more thickly covered with prickly appendages, decurrent from the base of the leaves. Flower-heads not so large, though yet globular and slightly drooping; the involucre bracts very numerous and narrow, ending in a linear, spreading or recurved prickly, the innermost often of a thinner texture, slightly coloured and scarcely prickly. Hairs of the pappus simple.

A very common Continental *Thistle*, extending eastward entirely across Asia, and northward to the Arctic Circle, although in Britain, like many others, it becomes scarce in Scotland. *Fl. summer*. Two forms are often distinguished



Fig. 552.

as species, the *C. acanthoides*, with the flower-heads single, on long peduncles, and the leaves often nearly glabrous, and *C. crispus*, with the heads clustered several together on short stalks, and the leaves usually rather broader and more cottony underneath; but they run too much one into the other to be separable even as permanent varieties.

4. Slender Thistle. *Carduus pycnocephalus*, Jacq.

(Fig. 553.)

(*C. tenuiflorus*, Eng. Bot. t. 412.)

A stiff annual or biennial, from 1 to 3 or 4 feet high, but not so stout as the last three, and much more covered, especially the stems and the under side of the leaves, with a white loose cotton. Leaves pinnatifid, with short, wavy, very prickly lobes, and decurrent along the stem, forming waved prickly wings as in the *welshed T.* Flower-heads rather numerous, but small and ovoid or oblong, generally in clusters at the top of the stem and branches. Involucre bracts rather broad at the base, ending in a narrow, straight or slightly spreading prickly. Florets

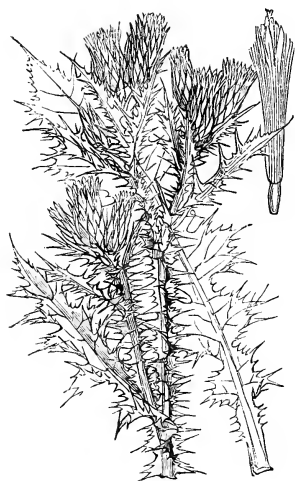


Fig. 553.

pink or whitish. Hairs of the pappus simple.

In waste places and cultivated ground, in western and southern Europe and central Asia, extending northward to Denmark, but scarcely eastward of the Rhine in central Europe. Not unfrequent in England and Ireland, especially near the sea, and occurs also in the lowlands of Scotland. *Fl. all summer.*

5. Spear Thistle. *Carduus lanceolatus*, Linn. (Fig. 554.)

(Eng. Bot. t. 107. *Cnicus*, Brit. Fl.)



Fig. 554.

A rather stout biennial, 3 or 4 feet high; the stem winged and prickly. Leaves waved and pinnatifid, with short but narrow lobes, the terminal longer and lanceolate, all ending in a stiff prickle, rough on the upper side with short almost prickly hairs, white and cottony underneath. Flower-heads few, ovoid, near an inch and a half long when in flower. Involucral bracts lanceolate, cottony, ending in a stiff, spreading prickle. Florets purple. Hairs of the pappus feathery.

In fields, pastures, and waste places, very common throughout Europe and Russian Asia, except the extreme north, and spread with cultivation into other parts of the world. Abundant in Britain. *Fl. all summer.*

6. Marsh Thistle. *Carduus palustris*, Linn. (Fig. 555.)

(Eng. Bot. t. 974. *Cnicus*, Brit. Fl.)

A stiff annual or biennial, 4 or 5 feet high, and scarcely branched; the stems quite covered with the prickly decurrent margins of the leaves as in the *wetted T.* Leaves narrow, the lower ones 6 to 8 inches long, pinnatifid with numerous ovate, wavy, prickly lobes, with a few rough hairs scattered on both surfaces; the upper leaves small and very narrow. Flower-heads rather numerous, small and ovoid, usually collected in clusters, forming an irregular terminal corymb. Involucral bracts numerous, with very small somewhat prickly points, the inner ones often coloured. Florets purple. Hairs of the pappus feathery.

In wet fields, and meadows, throughout Europe and Russian Asia, penetrating into the Arctic regions. Frequent in Britain. *Fl. summer.*

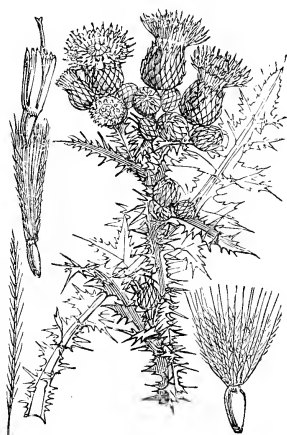


Fig. 555.

7. Creeping Thistle. *Carduus arvensis*, Curt. (Fig. 556.)

(Eng. Bot. t. 975, *male individual*. *Cnicus*, Brit. Fl.)

Rootstock perennial and creeping, with erect annual stems 3 or 4 feet high. Leaves narrow, pinnatifid, and very prickly, either embracing the stem with prickly auricles or shortly decurrent. Flower-heads not large, forming rather loose terminal corymbs, and always diœcious; the males nearly globular, with very projecting purple florets; the females with much longer involucres but shorter florets, the copious feathery pappus of the achenes projecting considerably as the fruit ripens: in both, the involucral bracts are numerous, appressed, with very small prickly points.

In cultivated and waste places, the commonest of European and Asiatic *Thistles*, accompanying cultivation to all



Fig. 556.

parts of the world; extending far to the north, though perhaps not quite to the Arctic Circle. Abundant in Britain. *Fl. summer*. A curious variety, with the leaves almost entire, not decurrent, and scarcely prickly (*C. setosus*), not uncommon in south-eastern Europe and western Asia, has been found in the county of Fife, in Scotland.

8. Woolly Thistle. *Carduus eriophorus*, Linn. (Fig. 557.)

(Eng. Bot. t. 386. *Cnicus*, Brit. Fl.)



Fig. 557.

The stoutest of all our indigenous *Thistles*, and much branched, but not so tall as some others. Leaves not decurrent, green and hairy above, white and cottony underneath, deeply pinnate, with narrow lobes ending in very sharp stout prickles. Flower-heads large and globular, clustered 2 or 3 together at the summits of the branches. Involucres covered with a cottony wool, the numerous bracts ending in a narrow prickly point. Hair of the pappus feathery.

In waste places, in central and southern Europe to the Caucasus, but not extending into northern Germany. In Britain, probably confined to the limestone districts of southern England. *Fl. summer*.

9. Melancholy Thistle. *Carduus heterophyllus*, Linn.

(Fig. 558.)

(Eng. Bot. t. 675. *Cnicus*, Brit. Fl.)

This species is not prickly like other *Thistles*, but resembles them in other respects. Rootstock perennial and creeping, the stems tall, stout, deeply furrowed, with a little loose cottony wool. Leaves clasping the stem, with scarcely decurrent auricles, lanceolate, glabrous and green above, very white and cottony underneath, bordered with very small, bristly but scarcely prickly teeth, and sometimes slightly lobed. Flower-heads about the size of those of the *spear T.*, growing singly

on long peduncles. Involucral bracts glabrous, lanceolate, obtuse, or with a very minute not prickly point. Hairs of the pappus feathery.

In mountain pastures, in northern Europe and Asia, and in the great central ranges of both continents. Frequent in Scotland, extending into northern England, and North Wales. *Fl. summer.*



Fig. 558.

10. **Tuberous Thistle.** *Carduus tuberosus*, Linn. (Fig. 559.)

(*Cnicus*, Eng. Bot. t. 2562.)

Rootstock woody, usually shortly creeping, emitting occasionally a few thick, almost woody, tuberous roots, and erect or ascending stems, but little divided, or sometimes simple, about 2 feet high. Radical leaves pinnatifid, the lobes waved and prickly, slightly hairy above, with more or less of a loose cottony wool underneath; the stem-leaves few, less divided, sessile or sometimes very shortly decurrent. Flower-heads not very large, ovoid, growing singly on long terminal peduncles. Involucral bracts lanceolate, not prickly, with more or less of cottony wool. Hairs of the pappus feathery.

In moist, rich meadows, and marshy, open woods, in western and south-central Europe, extending eastwards to Transylvania. In Britain, only in Wiltshire, near Heytesbury. *Fl. summer.*



Fig. 559.

11. Meadow Thistle. *Carduus pratensis*, Huds. (Fig. 560.)(Eng. Bot. t. 177. *Cnicus*, Brit. Fl.)

Fig. 560.

Probably a mere variety of the *tuberosus* *T.* The roots are less tuberous. Stems 1 to 2 feet high, usually simple, with a single ovoid flower-head, or occasionally divided into 2 or 3 long one-headed branches. Leaves more cottony than in the *tuberosus* *T.* and much less divided, the radical ones usually sinuate or shortly pinnatifid, the stem-leaves lanceolate, bordered only with short, slightly prickly teeth.

In low, wet pastures, boggy meadows, and marshy thickets, chiefly in western Europe. Abundant in some of the southern counties of England and Ireland, more rare in the north. *Fl. summer.* Luxuriant specimens, with more divided leaves, sometimes slightly decurrent, have been considered as a species under the name of *C. Forsteri*, or as hy-

brids between this and the *marsh T.* Another luxuriant variety occurs occasionally, approaching the *tuberosus T.* in foliage, but with 2 or 3 flower-heads rather close together, not on long separate peduncles.

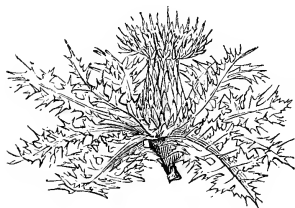
12. Dwarf Thistle. *Carduus acaulis*, Linn. (Fig. 561.)(Eng. Bot. t. 161. *Cnicus*, Brit. Fl.)

Fig. 561.

In the common state this is at once distinguished by the almost total want of stem. A thick, woody, perennial stock bears a spreading tuft of very prickly pinnatifid and glabrous leaves, in the midst of which are a few rather large sessile flower-heads. Involucres ovoid, not cottony, with numerous lanceolate, obtuse or scarcely pointed bracts. Florets purple. Hairs of the pappus

feathery. Occasionally, but rarely, the stem will grow up to the height of 2 or 3 inches.

In dry pastures, in temperate Europe and Russian Asia, extending northward to southern Scandinavia. In Britain, only in the southern and some central counties of England. *Fl. summer, rather late.* In some situations, on the Continent, the stem will grow out to 6 or 8 inches, but this variety is very rare in England.

XXV. **ONOPORD.** ONOPORDON.

Large-headed, stout, prickly herbs, only differing from *Thistle* in the receptacle, which, instead of bearing long chaffy bristles between the florets, is honeycombed into a number of little cavities, the jagged edges of which are shorter than the achenes.

There are but few species, natives of the Mediterranean and Caucasian regions, one only of which extends into central Europe.

1. **Common Onopord.** *Onopordon Acanthium*, Linn. (Fig. 562.)

(Eng. Bot. t. 977. *Scotch or Cotton Thistle.*)

A stout, branched biennial, attaining sometimes 6 feet or even more, covered with a loose cottony wool. Leaves coarsely toothed or pinnatifid, waved and very prickly, their broadly-decurrent margins forming prickly wings all down the stem. Flower-heads large, globular, erect, and solitary on the branches of a large irregular panicle. Involucral bracts numerous, ending in a long, lanceolate, spreading prickle. Hairs of the pappus rather longer than the achenes, not feathery, but strongly toothed when seen under a magnifying glass.

A native of the Mediterranean region and west-central Asia, not uncommon also in central Europe and all across Russian Asia, but spreads readily with cultivation, and it is difficult to say how far north it is indigenous. Now found in several parts of England, but certainly not wild in Scotland, although generally selected to represent the Scotch heraldic Thistle. *Fl. end of summer.*

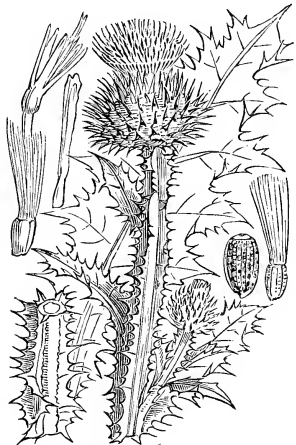


Fig. 562.

XXVI. **CARLINE.** CARLINA.

Low, very prickly herbs. Outer bracts of the involucre very prickly, inner ones coloured or shining, long, and spreading like the rays of a star. Receptacle bearing irregularly cut, chaffy scales between the florets. Achenes silky-hairy, with a feathery pappus.

A small European and Asiatic genus, easily distinguished by the involucre bracts.

1. **Common Carline.** *Carlina vulgaris*, Linn. (Fig. 563.)

(Eng. Bot. t. 1144.)



Fig. 563.

An erect biennial, seldom above 6 or 8 inches high. Leaves not decurrent, toothed or pinnatifid, and very prickly; the lower ones narrow, slightly covered with loose cottony wool; the upper ones broader and nearly glabrous. Flower-heads hemispherical, about an inch in diameter, usually 3 or 4 in a small terminal corymb. Outer involucre bracts broadly lanceolate, bordered with very prickly teeth, or lobes; inner ones linear, entire, with very smooth and shining, horizontally-spreading tips.

In dry, hilly pastures and fields, throughout Europe and Russian Asia, except the extreme north. Rather common in England and Ireland, extending into a few Scottish counties. *Fl. summer and autumn.*

XXVII. **CENTAUREA.** CENTAUREA.

Herbs, with entire or pinnatifid leaves, seldom prickly, and purple, blue, or sometimes yellow flowers. Involucres globular or ovoid, the bracts numerous, ending either in a prickle or in a fringed or toothed appendage. Outer row of florets usually longer than the others, and neuter. Receptacle bearing bristles between the florets. Achenes glabrous, with a short pappus of simple hairs or scales, sometimes very short, or rarely quite wanting.

One of the most numerous genera of *Thistleheads* in the Mediterranean and Caucasian regions, with a very few American species. The

enlarged outer florets, the most prominent character of the genus, are seldom deficient, and that chiefly in a common variety of our own *black Centaurea*. In that case the fringed involueral bracts as readily indicate the genus.

Involucres not prickly, or with very small prickly points to the bracts.

Involueral bracts with a broad, black, or brown fringed border or appendage.

Leaves mostly entire or toothed. Appendages almost concealing the bracts themselves 1. *Black C.*

Leaves deeply pinnatifid. Involueral bracts showing their green centres with a black fringed border 2. *Greater C.*

Involueral bracts ending in, or bordered by, minute teeth or prickles.

Outer florets bright blue. An erect cornfield annual 3. *Corn C.*

Florets purple. A spreading Jersey perennial 4. *Jersey C.*

Involueral bracts ending in a long, stout prickles.

Florets purple 5. *Starthistle C.*

Florets yellow 6. *Yellow C.*

The *C. montana*, from central and southern Europe, and a few others, are occasionally cultivated in our gardens.

1. *Black Centaurea*. *Centaurea nigra*, Linn. (Fig. 564.)

(Eng. Bot. t. 278; *C. nigrescens*, Brit. Fl. *Knapweed* or *Hardheads*.)

A perennial, with erect stems, hard and branched, 1 to 2 feet high. Leaves from linear to lanceolate or oblong; the upper ones entire or nearly so, clasping the stem at their base; the lower with a few coarse teeth or short lobes; all green, and rather rough with a few minute hairs, or slightly cottony underneath when young. Involucres globular, on terminal peduncles; the bracts closely imbricate, so as only to show their appendages, which are brown or black, and deeply fringed, except on the innermost bracts, where they are shining and usually jagged. Florets purple, either all equal or the outer row much larger and neuter as in the rest of the genus. Achenes slightly hairy, often apparently without any pappus, but really crowned by a ring of very minute scaly bristles, occasionally intermixed with a few longer, very deciduous ones.



Fig. 564.

by a ring of very minute scaly bristles, occasionally intermixed with a few longer, very deciduous ones.

In meadows and pastures, throughout Europe and western Asia, except the extreme north, extending probably all across Russian Asia. Very abundant in Britain. *Fl. all summer*. The two forms, with or without the outer row of large florets, are so different in appearance that it has often been attempted to distinguish them as species, but it has been now proved that they are mere varieties, and it is even believed by some that the same plant will appear in some years with and in others without the ray. The *C. Jacea* (Eng. Bot. t. 1678) is a variety, occurring occasionally in England, more frequently in some parts of the Continent, with the appendages of the involuclral scales of a much paler colour, with a much shorter fringe, or only jagged. This form passes, however, gradually into the common one.

2. Greater Centaurea. *Centaurea scabiosa*, Linn. (Fig. 565.)

(Eng. Bot. t. 56.)



Fig. 565.

A stouter plant than the *black C.*, more branched at the base; the leaves deeply pinnatifid, with linear or lanceolate lobes, often coarsely toothed or lobed. Flower-heads large, with purple florets, the outer ones always enlarged and neuter. Involuclral bracts broad, bordered only with a black appressed fringe, leaving the green centre exposed. Pappus of stiff hairs or bristles nearly as long as the achene.

In pastures, waste places, roadsides, etc., throughout Europe and Russian Asia, except the extreme north. Rather frequent in England, less so in Scotland, and scarcely indigenous beyond south-eastern Perth and Forfar. *Fl. summer and autumn*.

3. Corn Centaurea. *Centaurea Cyanus*, Linn. (Fig. 566.)

(Eng. Bot. t. 277. *Bluebottle* or *Cornflower*.)

An erect, branching annual, about 2 feet high, covered with a loose cottony down. Lower leaves usually toothed or pinnatifid; upper

ones, or sometimes nearly all, linear and entire. Involucres solitary, on long terminal peduncles, ovoid; the bracts appressed, often ending in a minute prickle, and bordered by a fringe of very small teeth. Central florets of a bluish purple; outer ones much larger, of a bright blue. Pappus about the length of the achene.

Apparently of south European or west Asiatic origin, but now spread as a corn-field weed over a great part of Europe and Asia. Not uncommon in British cornfields, and formerly much cultivated in flower-gardens, where it will sport much as to colour. *Fl. all summer.*



Fig. 566.

4. Jersey Centaurea. *Centaurea aspera*, Linn. (Fig. 567.)

(*C. Isnardi*, Eng. Bot. t. 2256.)

A biennial or perennial, much branched, very spreading or prostrate, with hard but not thick branches, glabrous, or rough with minute hairs. Leaves narrow; the lower ones pinnatifid, the upper ones entire. Flower-heads solitary at the ends of the branches, with one or two leaves close under them. Involucres about the size of those of the *corn C.*, with appressed glabrous bracts, not fringed, but most or all of them ending in a palmate appendage of 5 minute prickles or points.

In waste lands, not far from the sea; very common on the Mediterranean, and extending up the west coast of Europe to the Channel Islands. *Fl. summer and autumn.*



Fig. 567.

5. Star-thistle *Centaurea*. *Centaurea Calcitrapa*, Linn.
(Fig. 568.)

(Eng. Bot. t. 125.)



Fig. 568.

A coarse, green annual, sometimes slightly covered with cottony down, seldom rising to a foot in height, but with very spreading or prostrate branches. Leaves pinnatifid, with a few long linear or lanceolate lobes. Flower-heads sessile among the upper leaves or in the forks of the branches, not large in themselves, but the involueral bracts end in stiff spreading spines, $\frac{1}{2}$ to 1 inch long, with 1 or 2 smaller prickles at their base. Florets purple. Achenes without any pappus.

In waste places, and on roadsides, in central and especially southern Europe to the Caucasus, and most abundant near the sea. Found occasionally in some of the southern counties of England, but scarcely further northward.
Fl. summer and autumn.

6. Yellow *Centaurea*. *Centaurea solstitialis*, Linn. (Fig. 569.)
(Eng. Bot. t. 243.)



Fig. 569.

A stiff, erect annual, 1 to 2 feet high, with few branches, and covered with a white cottony wool. Radical leaves pinnatifid, upper ones small and linear, decurrent in long, narrow wings along the stem. Flower-heads solitary at the ends of the branches, nearly globular; the innermost bracts ending in a small shining appendage; the intermediate ones in a long spreading prickle, with one or two small ones at its base; the outermost usually with only a few small, palmate prickles, as in the *Jersey C.* Florets of a bright yellow.

In waste and cultivated places, in southern Europe and western Asia, especially near the sea, and, as a weed of cultivation, widely spread over Europe, Asia, and other parts of the world. In

Britain, it appears occasionally in cornfields, and sometimes in waste places near the sea. *Fl. summer and autumn.*

XXVIII. **SALSIFY.** TRAGOPOGON.

Biennials or perennials, with tap-roots, and long, narrow, grass-like, entire leaves, broader and sheathing at the base. Involucre of 8 to 12 bracts, nearly equal, and slightly united at the base. Achenes narrowed at the top into a long beak, bearing a pappus of feathery hairs.

A genus not very numerous in species, spread over Europe and temperate Asia, easily known among the British *Ligulates* by the foliage. In this respect it resembles *Scorzonera*, a numerous exotic genus, of which one species, the *S. hispanica*, is often cultivated in our gardens for the same purposes as the *Salsify*.

Flowers yellow	1. <i>Meadow S.</i>
Flowers purple	2. <i>Purple S.</i>

1. **Meadow Salsify.** *Tragopogon pratense*, Linn. (Fig. 570.)

(Eng. Bot. t. 434. *T. minor*, Bab. Man. *Yellow Goat's-beard*.)

Stem erect, slightly branched, 1 to 2 feet high. Radical and lower leaves 5 to 8 inches long or even more, shortly dilated at the base, glabrous and slightly glaucous; upper leaves shorter, with the dilated base longer in proportion. Peduncles long, thickened at the summit, each with a single head of yellow flowers. Involucral bracts narrow-lanceolate, 1 to 1½ inches long. Florets sometimes not half so long, but varying from that to the full length of the involucre. Achenes long and striate, the slender beak as long as the achene itself, the hairs of the pappus long and very feathery.

In meadows and rich pastures, throughout Europe and western Asia, except the extreme north. Abundant in Britain, extending far north into Scotland. *Fl. early summer.* It is often divided into two or more species, according to the relative length of the florets and involucre.



Fig. 570.

2. Purple Salsify. *Tragopogon porrifolium*, Linn.
(Fig. 571.)

(Eng. Bot. t. 638. *Salsify* or *Salsafy*.)

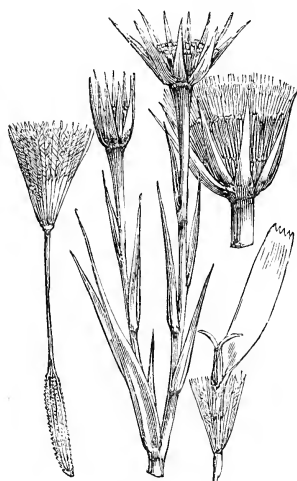


Fig. 571.

It is difficult to assign any positive character to distinguish this from the meadow *S.* beyond the colour of the florets, which is of a very deep violet-blue or purple. It is generally of more luxuriant growth, the peduncles more thickened at the top, the involucre longer in proportion to the florets, and the beak of the achenes and pappus longer.

In meadows and pastures, in the Mediterranean region, but only as an introduced plant in central and northern Europe, having been long cultivated for culinary purposes. In Britain, confined to southern England, where it appears to be well established in some localities. *Fl.* early summer.

XXIX. **HELMINTH.** HELMINTHIA.

Habit and pappus of *Picris*, from which it only differs in the involucre, of which the outer bracts are broadly cordate and leafy, and in the achenes narrowed at the top into a short beak.

1. Oxtongue Helminth. *Helminthia echioides*, Gærtn.
(Fig. 572.)

(*Picris*, Eng. Bot. t. 972.)

A coarse, erect annual or biennial, 1 to 2 or 3 feet high, rough with numerous short, stiff, almost prickly hairs, often hooked as in *Picris*. Leaves lanceolate, sinuate or coarsely toothed, very rough; the lower ones narrowed at the base; the upper ones clasping the stem or shortly decurrent. Flower-heads rather small, rather crowded, on short peduncles, forming an irregular terminal corymb. Outer broad bracts

of the involucre 4 or 5, rough like the leaves; inner ones about 8, lanceolate, and much thinner. Achenes ending in a beak, with a dense, white, feathery pappus.

On hedge-banks, edges of fields, and waste places; common in central and especially southern Europe to the Caucasus, scarcely extending into northern Germany. Dispersed over England and Ireland, but does not reach Scotland. *Fl. summer and autumn.*



Fig. 572.

XXX. **PICRIS.** PICRIS.

Coarse, hispid herbs, with toothed leaves, and rather small heads of yellow flowers, in a loose, irregular corymb. Involucre of several nearly equal, erect, inner bracts, with 2 or 3 outer rows of smaller ones, usually spreading. Achenes transversely striated, not beaked, with a whitish pappus, of which the inner hairs at least are feathery.

A genus containing but few species, natives of Europe and temperate Asia, having much the appearance of *Hawkweed* and *Crepis*, but readily distinguished by the feathery pappus.

1. **Hawkweed Picris.** *Picris hieracioides*, Linn. (Fig. 573.)

(Eng. Bot. t. 196.)

A biennial, 1 to 2 or 3 feet high, covered with short, rough hairs, most of which are minutely hooked at the top, so as to cling to whatever they come in contact with. Leaves lanceolate, the lower ones tapering into a stalk, and often 6 inches or more long, the upper ones clasping the stem. Peduncles rather long and stiff. Involucres scarcely 6 lines long. Pappus of a dirty white, the hairs usually very feathery, except a few of the outer ones of each achene.



Fig. 573.

On roadsides, borders of fields, and waste places, in southern and central Europe, as far as southern Scandinavia, in temperate Russia and central Asia, and now spread as a weed of cultivation to many other parts of the world. Abundant in the greater part of England, but does not perhaps extend into Scotland, and has only been found in one place, at Portmarnock, in Ireland. *Fl. summer and autumn.*

XXXI. **HAWKBIT.** LEONTODON.

Herbs, with a perennial stock, radical, spreading leaves, simple or slightly branched, usually leafless flower-stems, and yellow flowers. Involucres of several nearly equal, erect, inner bracts, and two or three rows of smaller outer ones. Receptacle without bracts between the florets. Achenes more or less tapering at the top into a short beak, sometimes scarcely perceptible. Pappus of all, or at least the central florets, composed of feathery hairs.

A genus not numerous in species, but abundantly spread over Europe and Russian Asia. It was formerly united with *Dandelion*, from which it has been separated on account of the feathery pappus.

All the achenes with a pappus of feathery hairs.

Hairy plant, with simple flower-stems. Pappus with an outer row of minute, simple hairs 1. *Common H.*

Plant nearly glabrous. Flower-stems often divided, enlarged under the flower-heads. All the hairs of the pappus of equal length 2. *Autumnal H.*

Achenes of the outer row of florets with a pappus of very short, simple hairs. Flower-stems simple 3. *Lesser H.*

1. **Common Hawkbit.** *Leontodon hispidus*, Linn. (Fig. 574.)

(*Hedynois*, Eng. Bot. t. 554. *Apargia*, Bab. Man.)

The whole plant more or less hispid with erect, stiff, short hairs, often forked or stellate at the top. Leaves long and narrow, coarsely toothed or pinnatifid. Peduncles 6 inches to a foot or more long, slightly swollen at the top, with a single rather large flower-head. Bracts of the involucre narrow, and always hispid, the inner row much longer than the outer ones. Achenes long, striate, and transversely rugose, slightly tapering at the top, but seldom distinctly beaked. Pappus of about a dozen brown, feathery hairs, about as long as the achene, surrounded by 5 or 6 others not a quarter that length.

In meadows and pastures, very common in Europe, and eastward to the Caucasus and the Ural, except the extreme north. Abundant in Britain, as far north as Glasgow and Forfar. *Fl. the whole summer and autumn.* A nearly glabrous variety (*L. hastilis*), frequent on the Continent, does not appear to have been found in Britain.



Fig. 574.

2. **Autumnal Hawkbit.** *Leontodon autumnalis*, Linn.

(Fig. 575.)

(*Hedynois*, Eng. Bot. t. 830. *Apargia*, Bab. Man.)

Habit nearly of the *long-rooted Hypochaere*, but with smaller flower-heads, and no scales between the florets. Leaves long, narrow, and pinnatifid, with a few narrow lobes, glabrous, or with a few long, stiff hairs. Flower-stems erect, usually with 1 or 2 single-headed branches, having sometimes 1 or 2 narrow, nearly entire leaves near the base; the branches or peduncles nearly glabrous, bearing a few small scales. Involucres oblong, tapering at the base into the enlarged summit of the peduncle, glabrous in the common variety, with closely appressed, imbricated bracts. Achenes long, striate, and transversely wrinkled, tapering into a short beak, scarcely perceptible in the outer ones. Pappus brown and feathery, without the short, outer hairs of the common *H.*



Fig. 575.

In meadows, pastures, and waste places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Abundant all over Britain. *Fl.* summer and autumn. The mountain *H.* (*Hedypnois Taraxaci*, Eng. Bot. t. 1109) is a northern or alpine variety of dwarf stature, with the flower-stems often simple, and rather large flower-heads, the much enlarged summit of the peduncle, and the involucre more or less covered with black hairs. Not unfrequent in the Scotch Highlands. The true *L. Taraxaci*, from the alps of central Europe, is quite a distinct plant.

3. Lesser Hawkbit. *Leontodon hirtus*, Linn. (Fig. 576.)

(*Hedypnois*, Eng. Bot. t. 555. *Thrinicia*, Brit. Fl.)



Fig. 576.

Usually a smaller plant than the two last, and glabrous, or with a few stiff, mostly forked hairs on the leaves and lower part of the peduncles. Leaves oblong or linear, coarsely toothed, sinuate or shortly pinnatifid. Peduncles seldom above 6 inches high, with a single rather small head of bright yellow flowers. Involucres green, glabrous, thickening at the base after flowering, consisting of 10 or 12 nearly equal bracts, with several small imbricated ones at the base. Achenes of the outer row curved, slightly tapering at the top, with a very short, scaly pappus; the others like those of the common *H.*

In rather dry open pastures, moors, and waste places, in central and southern Europe, scarcely extending to its eastern limits, or northward to the Baltic.

Very common in England and Ireland, and found in Scotland as far as Glasgow and Fife. *Fl.* summer.

XXXII. **HYPOCHÆRE.** HYPOCHÆRIS.

Annuals or perennials, with the habit and pappus of *Hawkbit*, but more frequently branched; the involucre rather more imbricated, and there are a few chaffy scales on the receptacle between the florets, at least amongst the inner ones.

More numerous in species than *Hawkbit*, it has also a wider geographical range, extending over Europe, Russian Asia, North America, and western and southern South America.

Involucres oblong, nearly glabrous.

Florets scarcely longer than the involucre. Outer

achenes without a beak 1. *Glabrous H.*

Florets longer than the involucre. All the achenes

ending in a slender beak 2. *Long-rooted H.*

Involucres large, hemispherical, and hairy 3. *Spotted H.*

1. **Glabrous Hypochære.** *Hypochæris glabra*, Linn.

(Fig. 577.)

(Eng. Bot. t. 575.)

Much resembles the *long-rooted H.*, but is a smaller plant, with an annual root, and quite glabrous; the stems seldom attain a foot in height, with much smaller flower-heads, although the involucre become much elongated after flowering. The achenes are similarly wrinkled, and have the same feathery pappus, which however is sessile on the achenes of the outer florets, whilst on the central ones it is supported on a slender beak, as in the *long-rooted H.*

Although generally spread over central and southern Europe, and naturalized even in distant temperate climates, it is much less common than the *long-rooted H.*, growing chiefly in sandy situations. Thinly scattered over England, the Scottish stations are still fewer, and not recorded from Ireland. *Fl. summer.*

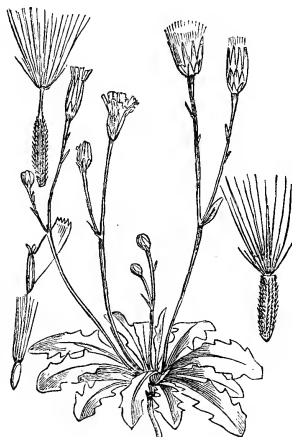


Fig. 577.

2. Long-rooted Hypochære. *Hypochæris radicata*, Linn.

(Fig. 578.)

(Eng. Bot. t. 831. *Cat's-ear*.)

Fig. 578.

Rootstock perennial. Leaves all radical, spreading, narrow, more or less toothed or pinnately lobed, hispid on both sides with stiff hairs. Stems erect and leafless, 1 to 2 feet high, usually divided like the *autumnal Hawkbit* into two or three long branches or peduncles, slightly thickened upwards, each bearing a few small scales, and terminated by a rather large head of flowers. Involucres near an inch long, narrow but somewhat thickened at the base; the bracts imbricated in several rows, the outer ones smaller, all glabrous or with a few short hairs on the back. Scales of the receptacle long, narrow, and finely pointed. Achenes transversely wrinkled, all narrowed into a long slender beak with a feathery pappus.

In meadows, pastures, and waste places throughout Europe, except the extreme north, but scarcely extends into Asia. Abundant in Britain, extending far into the north of Scotland. *Fl. summer and autumn.*

3. Spotted Hypochære. *Hypochæris maculata*, Linn.

(Fig. 579.)

(Eng. Bot. t. 225.)

Rootstock perennial. Leaves all or mostly radical, spreading, broadly obovate, or rarely oblong, coarsely toothed or nearly entire, hairy on both sides, and often spotted. Flower-stem erect, 1 to 2 feet high, usually simple, but occasionally bearing a small leaf near the base, and terminated by a single large flower-head; the involucre broad and hairy. The stem is rarely forked, with two flower-heads.

In open pastures, and meadows, widely spread over Europe and Russian Asia, chiefly in mountain districts, although not an Arctic plant. Rare in Britain, the only reliable localities being in Suffolk, Cambridgeshire, and North Wales. *Fl. summer.*



Fig. 579.

XXXIII. LETTUCE. LACTUCA.

Annual or perennial herbs, glabrous or with a few stiff bristles; the stems leafy, erect, and branched, with (in the British species) numerous small heads of yellow flowers. Involucre narrow, of a few imbricated bracts, containing very few florets. Achenes flattened, tapering into a slender beak, with a pappus of numerous white and silky, simple hairs.

A genus widely spread over southern Europe and central Asia, and among the exotic species includes several species differing from the British ones in their large blue flowers. It has the flattened achenes of *Southistle*, from which the only positive distinctive character is the beak of the achenes, but the narrow involucre and few florets generally give it a different habit.

Leaves thin, on long stalks, with a broad terminal lobe. Panicle

slender. Beak shorter than the achene itself 1. *Wall L.*

Leaves mostly sessile, rather stiff, often prickly. Panicle rigid.

Beak as long as or longer than the achene.

Panicle rather loose, oblong or spreading. Beak about the length of the achene 2. *Prickly L.*

Panicle almost reduced to a long, clustered spike. Beak about twice the length of the achene 3. *Willow L.*

Our garden *Lettuces* are luxuriant forms, produced by long cultivation of one or perhaps two southern species, which have not been as yet satisfactorily identified, some botanists believing them to be cultivated varieties of the *prickly L.*

1. Wall Lettuce. *Lactuca muralis*, Fresen. (Fig. 580.)

(*Prenanthes*, Eng. Bot. t. 457.)



Fig. 580.

A glabrous, erect annual or biennial, about 2 feet high, with slender branches, forming a loose, terminal panicle. Leaves few and thin, rather large, with a broadly triangular, toothed or lobed, terminal segment, and a few irregular smaller ones along the stalk; the upper leaves small, narrow, and entire or toothed. Flower-heads small, on slender pedicels. Involucres about 5 lines long, of 5 equal, linear bracts, with 1, 2, or 3 very small outer ones, containing 4 or 5 florets. Beak of the achenes much shorter than the achene itself.

In woods and shrubby places, in Europe and Russian Asia, extending far into the north, although not an Arctic plant. Not uncommon in England, more rare in southern Scotland, and only known in one station in Louth County in Ireland. *Fl. summer.*

2. Prickly Lettuce. *Lactuca Scariola*, Linn. (Fig. 581.)

(Eng. Bot. t. 268.)

An erect, stiff annual or biennial, 2, 3, or even 4 feet high, of a more or less glaucous green, with short but spreading branches, and quite glabrous, except a few stiff bristles or small prickles on the edges or on the midrib of the leaves. Leaves more or less spreading, varying from lanceolate to broadly oblong, either bordered only with small teeth, or with a few short lobes or coarse teeth usually curved downwards, or deeply pinnatifid with few narrow lobes; the upper ones narrow, more entire, and clasping the stem with pointed auricles. Flower-heads in a more or less leafy panicle, sometimes long and narrow, sometimes more branched and spreading. Involucres 4 or 5 lines long, of a few imbricate bracts, the short, broad, outer ones

passing gradually into the inner, long, narrow ones. Florets 6 to 10 or 12, of a pale yellow. Achenes much flattened, obovate-oblong, striated, varying in colour from nearly white to nearly black, with a slender beak about the length of the achene.

In dry or stony wastes, on banks and roadsides, in central and southern Europe, extending over a great part of central Asia. Thinly scattered in Britain, from southern England to the low tracts in the south-east Highlands of Scotland. *Fl. summer*. The name of *L. Scariola* is often limited to the varieties with more erect leaves, with deeper and narrower lobes; and those with broader leaves, toothed only, and not so glaucous, have been considered as a distinct species, under the name of *L. virosa* (Eng. Bot. t. 1957).



Fig. 581.

3. Willow Lettuce. *Lactuca saligna*, Linn. (Fig. 582.)

(Eng. Bot. t. 707.)

Very near the *prickly L.*, but more slender and twiggy; the leaves upright against the stem, and narrower; the stiff panicles with branches so short that the flower-heads appear clustered in a simple spike; and the beak of the achene from twice to three times its own length. These characters are however so variable as to occasion some doubt whether the two species are really distinct.

The commonest form in the Mediterranean and Caucasian regions, extending to some parts of central Europe. Rare in Britain; most certainly recorded from the banks of the Thames in Kent. *Fl. summer*.



Fig. 582.

XXXIV. **SOWTHISTLE.** *SONCHUS*.

Erect, leafy herbs, either glabrous or with more or less glandular hairs on the panicles; the leaves usually pinnately lobed or coarsely toothed, and clasping the stem at the base; the flower-heads in terminal panicles, with numerous yellow or blue florets. Involucre ovoid, with imbricated bracts, and usually becoming conical after flowering. Achenes flattened and striate, not beaked; the pappus sessile, of numerous simple hairs.

A considerable genus, spread over the temperate regions of the northern hemisphere, distinguished from *Lettuce* by the sessile pappus, from *Crepis* and *Hawkweed* by the flattened achenes.

Flowers yellow. Pappus white and silky.

Perennials. Flower-heads large. Involucres hairy at the base.

Marsh plant, the auricles of the leaves narrow and acute 2. *Marsh S.*

Field weed, the auricles of the leaves short and broad . 1. *Corn S*

Annuals. Flower-heads rather small and pale. Involucres

glabrous 3. *Common S.*

Flowers blue. Pappus of stiff, bristly hairs, of a dirty white 4. *Alpine S.*

1. **Corn Sowthistle.** *Sonchus arvensis*, Linn. (Fig. 583.)

(Eng. Bot. t. 674.)



Fig. 583.

Rootstock creeping. Stems 2 to 3 feet high. Leaves long, pinnatifid or sinuate, the lobes lanceolate or triangular, more or less curved downwards, and bordered by small prickly teeth; the lower ones stalked, the upper ones clasping the stem with short, broad auricles. Flower-heads large, of a bright yellow, in loose terminal panicles; the branches, peduncles, and involucres more or less hispid with brown or black glandular hairs. Achenes striated and transversely wrinkled, with a pappus of copious, white, silky hairs.

A cornfield weed, extending over the whole of Europe and Russian Asia, except the extreme north. Common in Britain. *Fl. summer and autumn.*

2. Marsh Sowthistle. *Sonchus palustris*, Linn. (Fig. 584.)

(Eng. Bot. t. 935.)

This has the large flowers, glandular hairs, and general habit of the *corn S.*, but is a much taller plant; the root-stock scarcely creeps, and the leaves are narrow, often 8 or 10 inches long, clasping the stem with long pointed auricles, and either undivided or with one or two pairs of long lanceolate lobes.

In marshes, and the edges of ponds and wet ditches. Said to have nearly the geographical range of the *corn S.*, but appears to be more confined to eastern Europe, and nowhere common. In Britain, very rare, the only certain localities being in the marshes of some of the eastern counties of England. *Fl.* late summer, or autumn.



Fig. 584.

3. Common Sowthistle. *Sonchus oleraceus*, Linn.

(Fig. 585.)

(Eng. Bot. t. 843.)

An annual, with a rather thick hollow stem, 1 to 3 or even 4 feet high, perfectly glabrous, except occasionally a very few stiff glandular hairs on the peduncles. Leaves thin, pinnatifid, with a broad, heart-shaped or triangular terminal lobe, bordered with irregular, pointed or prickly teeth, and a few smaller lobes or coarse teeth along the broad leafstalk; the upper leaves narrow and clasping the stem with short auricles. Flower-heads rather small, in a short corymbose panicle, sometimes almost umbellate; the involucre remarkably conical after flowering. Florets of a pale yellow. Achenes flattened, with longitudinal ribs often marked with transverse wrinkles or asperities, the pappus of copious snow-white hairs.

A weed of cultivation, so universally distributed over the globe, except perhaps some tropical districts, that the limits of its native country cannot now be fixed; probably truly indigenous in Europe and cen-



Fig. 585.

tral Asia. Very abundant in Britain. *Fl. the whole season.* The *prickly S.* (*S. aspera*, Eng. Bot. Suppl. t. 2765 and 2766) appears to be a marked variety, rather than a species, in which the longitudinal ribs of the achenes have not the transverse wrinkles. The leaves are usually darker in colour and less divided, but much more closely bordered with prickly teeth; and the auricles which clasp the stem are broader, rounded, and more prickly toothed: none of these characters are, however, constant. It is almost always mixed with the *common S.*, and in many places as abundant.

4. Alpine Sowthistle. *Sonchus alpinus*, Linn. (Fig. 586.)

(*S. caeruleus*, Eng. Bot. t. 2425. *Mulgedium*, Brit. Fl.)

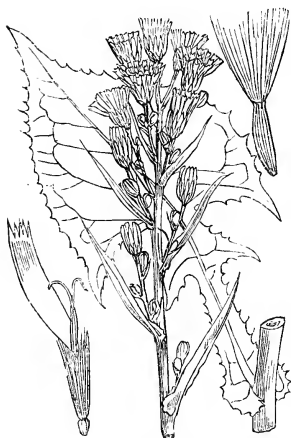


Fig. 586.

Stock perennial, with erect stems 2 to 3 feet high. Leaves much like those of the *common S.*, but with a much larger, broadly triangular, and pointed terminal segment. Panicle oblong, almost narrowed into a raceme, more or less hispid with glandular hairs. Involucres narrow, of but few bracts, containing 12 to 20 deep-blue florets. Achenes oblong, but slightly flattened; the hairs of the pappus of a dirty white, and rather stiffer than in the other species.

In moist, rocky situations, in northern and Arctic Europe and Asia, limited in central and southern Europe to mountain-ranges. In Britain, only in the Lochnagar and Clova mountains and their vicinity, where it is now becoming very rare. *Fl. summer, rather late.* The differences in the pappus which have induced its separation as a genus,

under the name of *Mulgedium*, will scarcely hold good in some other exotic species of blue *Sowthistles*.

XXXV. DANDELION. TARAXACUM.

Herbs, with a perennial rootstock, radical leaves, and radical peduncles, with single heads of yellow flowers. Involucres of several nearly equal, erect inner bracts, and several imbricated outer ones. Receptacle without scales. Achenes tapering into a long slender beak, with a pappus of numerous simple hairs.

A widely diffused genus, of which all the described species may perhaps be considered as varieties of a single one, differing from *Hawkbit* in the simple hairs of the pappus, from *Crepis* chiefly in the leafless simple peduncles.

1. Common Dandelion. *Taraxacum Dens-leonis*, Desf. (Fig. 587.)

(*Leontodon Taraxacum*, Eng. Bot. t. 510.)

The rootstock descends into a thick tap-root, black on the outside, and very bitter. Leaves varying from linear-lanceolate and almost entire to deeply pinnatifid, with broad triangular lobes usually pointing downwards, the terminal one larger, obovate or acute. Peduncles 2 to 6 or 8 inches high. Involucral bracts linear, often thickened towards the top, or with a tooth on the back below the point. Achenes slightly or not at all compressed, striated, marked upwards with short pointed asperities, the beak two or three times as long as the achene itself.

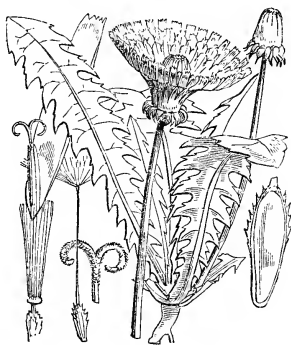


Fig. 587.

In meadows and pastures, cultivated and waste places, throughout Europe, Russian and central Asia, and northern America to the Arctic regions, and now a troublesome weed in almost all cultivated parts of the world. Among the numerous forms which have given rise to the distinction of a considerable number of supposed species, the most remarkable British ones are the *common D.*, with pinnatifid leaves and the outer involucral bracts much recurved, and the *marsh D.* (*T. palustre*, Eng. Bot. t. 553), with narrow leaves nearly entire or sinuate, and the outer involucral bracts scarcely spreading at the tips.

XXXVI. **CREPIS.** CREPIS.

Annuals or biennials, rarely forming a stock of longer duration, usually glabrous or slightly hairy, with branched, more or less leafy stems, and rather small heads of flowers in loose panicles, yellow in the British species. Involucre of several, nearly equal, linear inner bracts, with smaller outer ones. Receptacle without scales. Achenes not compressed, angular or striated, more or less narrowed at the top or beaked, with a pappus of copious simple hairs, usually very white.

One of the largest genera of *Ligulates* in Europe and Asia, with a very few American species, all nearly allied to *Hawkweed*, but mostly distinguished by habit as well as by the achenes contracted at the top and the white pappus. There are some species, however, so nearly intermediate between the two genera that they are referred to the one or to the other according to peculiar views of individual botanists.

Achenes narrowed into a distinct, slender beak (*Borckhausia*).

All the achenes with a long, slender beak. Outer involucral bracts lanceolate, whitish at the the edges . . . 1. *Beaked C.*

Achenes of the outer florets scarcely beaked, the others with a long beak. Outer involucral bracts small, and very narrow . . . 2. *Fetid C.*

Achenes contracted at the top, but without a distinct beak.

Lower leaves pinnatifid, or very narrow. Flower-heads numerous. Pappus very white, and silky.

Outer bracts of the involucre narrow-linear . . . 3. *Smooth C.*

Outer bracts of the involucre oblong-linear, with a whitish edge . . . 4. *Rough C.*

Leaves mostly oblong, coarsely toothed or entire. Flower-heads few. Pappus not very white, and rather stiff.

Leaves mostly entire. Achenes with about 20 ribs or striæ . . . 5. *Hawkweed C.*

Leaves mostly toothed. Achenes with 10 ribs or striæ 6. *Marsh C.*

The *pink Hawkweed*, formerly much cultivated in flower-gardens, is a species of *Crepis* from south-eastern Europe; the *bristly Crepis* (*C. setosa*, Eng. Bot. Suppl. t. 2945), which has the long-beaked achenes of the *beaked C.*, but is covered with stiff, spreading hairs, is a south-east European plant, which has occasionally appeared in Britain as a weed of cultivation.

1. **Beaked Crepis.** *Crepis taraxacifolia*, Thuil. (Fig. 588.)

(Eng. Bot. Suppl. t. 2929. *Borckhausia*, Brit. Fl.)

Much resembles some forms of the *rough C.*, but easily known by the pappus. Leaves chiefly radical and pinnatifid, with a large, terminal,

coarsely toothed lobe, and small ones along the stalk. Stems erect, 1 to 2 feet high, bearing a few small, narrow leaves. Flower-heads smaller than in the *fetid C.*, forming a loose, terminal, flat corymb. Involucres scarcely hairy, the outer bracts much shorter than the inner ones, lanceolate, and more or less membranous and whitish on the edges. Achenes all terminated by a slender beak about the length of the achene itself.

In rather dry pastures, and waste places, in central and especially southern Europe, and eastward to the Caucasus, not extending into northern Germany. In Britain, chiefly in limestone districts of southern England and Ireland; rather more frequent than the *fetid C.*, but appears to have been frequently confounded with that plant or with the *rough C.* *Fl. summer.*



Fig. 588.

2. Fetid Crepis. *Crepis foetida*, Linn. (Fig. 589.)

(Eng. Bot. t. 406. *Borckhausia*, Brit. Fl.)

A slightly hairy annual or biennial, seldom a foot high, with a few spreading branches. Radical leaves irregularly pinnatifid, with short lobes, the terminal one varying from broadly triangular to narrow-oblong; the stem-leaves narrow, the lower slightly pinnatifid, the upper entire or toothed. Flower-heads few, on long peduncles, usually recurved after flowering. Involucres hairy, the outer bracts small, and very narrow. The beak of the outer achenes is very short, often scarcely distinct, whilst that of the inner ones is long and slender, carrying up the whole pappus above the tips of the involucral bracts.

In rather dry pastures, and waste places, in southern Europe to the Caucasus, becomes rare further north. In Britain only in some of the southern and eastern counties of England. *Fl. summer.*

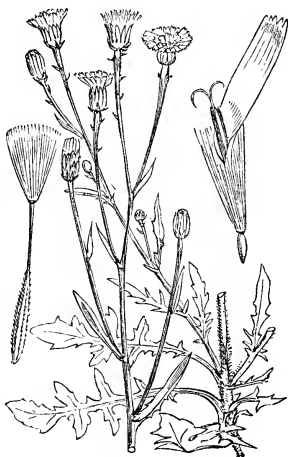


Fig. 589.

3. Smooth Crepis. *Crepis virens*, Linn. (Fig. 590.)

(*C. tectorum*, Eng. Bot. t. 1111.)



Fig. 590.

An erect or ascending, branched annual or biennial, from 1 to 3 feet high, usually glabrous or nearly so. Leaves linear or lanceolate, toothed or pinnatifid, with triangular or narrow, but short lobes; the radical ones stalked, the upper ones clasping the stem by pointed, spreading auricles. Flower-heads small, in loose, often leafy panicles. Involucres often slightly hispid, and become conical after flowering; the outer bracts narrow-linear, and rather close. Achenes narrow-oblong, very slightly contracted at the top, but not beaked, and generally shorter than the pappus, although there are frequently in the same head a few much longer than the rest, and longer than their own pappus.

In pastures, on dry banks, roadsides, and waste places, throughout western and central Europe, from Scandinavia to the Mediterranean; further east apparently replaced by the true *C. tectorum*. One of the commonest of the British *Ligulates*. *Fl. the whole summer and autumn*. It varies much in stature and in the size and number of the flower-heads, but they are always smaller than in any other British species.

4. Rough Crepis. *Crepis biennis*, Linn. (Fig. 591.)

(Eng. Bot. t. 149, *not good*.)

A taller and stouter plant than the *smooth C.*, more frequently biennial, less branched from the base, but forming a broad, terminal corymb of rather larger flower-heads; the leaves more or less rough with short, stiff hairs; and the outer bracts of the involucre broader, with a whitish, membranous edge. In this respect it resembles the larger forms of the *beaked C.*, but the achenes have the ribs much smoother, and although narrowed at the top, they do not bear the long, slender beak of that species.

In similar situations with the last three, dispersed over temperate Europe, from Sweden to the Mediterranean. Rare in Britain; its pre-

cise geographical limits are indeed not well ascertained, as it is often confounded with the common *smooth C.* or with the *beaked C.*, but I have seen true specimens from the central and eastern counties of England. *Fl. summer.*



Fig. 591.

5. Hawkweed Crepis. *Crepis hieracioides*, Jacq.
(Fig. 592.)

(*C. succisaefolia*, Brit. Fl. *Hieracium molle*, Eng. Bot. t. 2210.)

Like the *marsh C.*, this has much the habit of a *Hawkweed*, but the pappus is white and soft, as in *Crepis*. It is an erect, scarcely branched perennial, a foot high or rather more, glabrous or slightly hairy. Leaves entire or with a few minute teeth; the radical and lower ones obovate-oblong, on long stalks; the upper ones few, narrow, and clasping the stem. Flower-heads few, in a loose corymb, like those of the *marsh C.*, but the achenes are finely striate, with about 20 ribs.

In meadows and pastures, chiefly in mountain districts, all across central Europe, from the Pyrenees to the Russian frontier, not extending into Scandinavia. In Britain, in a few localities in southern Scotland, in northern England and in Ireland. *Fl. summer and autumn.*



Fig. 592.

6. Marsh Crepis. *Crepis paludosa*, Mœnch. (Fig. 593.)

(Hieracium, Eng. Bot. t. 1094.)



Fig. 593.

This species has almost as much the habit and characters of *Hawkweed*, with which Linnæus associated it, as of *Crepis*, to which it is referred by modern botanists. It is an erect, scarcely branched perennial, but of short duration, and nearly glabrous, 1 to 2 feet high. Radical leaves ovate, coarsely toothed, with a few small lobes along the stalk; the stem-leaves from broadly oblong to lanceolate, pointed, toothed, especially in the lower part, and clasping the stem by rather large, pointed auricles. Flower-heads yellow, rather large, in corymbs of 8 or 10; the involucre more or less hairy, with black, spreading hairs. The pappus is of a dirty white, almost like that of a *Hawkweed*, but the achenes are distinctly contracted at the top as in *Crepis*, and marked with 10 ribs or striæ.

In moist, shady situations, in northern Europe, and all across Russian Asia, becoming a mountain plant in southern Europe. Extends all over Scotland, and southward into the central counties of England, and into South Wales, and is not rare in Ireland. *Fl. summer and autumn.*

XXXVII. **HAWKWEED.** HIERACIUM.

Herbs, with a perennial stock, entire or toothed leaves, and yellow or rarely orange-red flower-heads, either on leafless radical peduncles, or in terminal corymbs or panicles on leafy stems. Involucre more or less imbricated. Receptacle without scales. Achenes angular or striated, not narrowed at the top; with a pappus of simple, generally stiff hairs, of a tawny-white or brownish colour.

A rather numerous European and north Asiatic genus, with a few American species, very nearly allied to *Crepis*, but the achenes are not perceptibly contracted at the top, and the hairs of the pappus are

usually stiffer, and never so white. The habit is also different, with the exception of a few species, which are also intermediate in more essential characters. The species are some of them very variable, and specimens are frequently found apparently intermediate between some of the commonest ones. In the attempt to classify these forms, and to give greater exactness to their definitions, modern botanists have distributed them into a large number of supposed species, amounting to between 30 and 40 for Britain alone. But the difficulty of distinguishing them appears only to increase with their subdivision, and the seven here enumerated will probably be found to be the only truly botanical species indigenous to Britain.*

Peduncles radical, bearing a single flower-head.

Peduncles leafless. Stems creeping. Leaves white underneath. Flower-heads pale-yellow 1. *Mouse-ear H.*

Peduncles or flower-stems with one or more narrow leaves.

No creeping stems. Leaves not white. Flower-heads large, bright yellow.

Radical leaves ovate. Involucres with short hairs . . . 3. *Wall H.*

Radical leaves narrow. Involucres with long hairs . . . 2. *Alpine H.*

Flowering-stems with more than one flower-head.

Radical leaves mostly persistent at the time of flowering.

Stem-leaves one or few. Outer involucre bracts few and short.

Stem-leaves ovate and toothed, or small and narrow, stalked or sessile, scarcely stem-clasping 3. *Wall H.*

Stem-leaves one or two, entire, glaucous, clasping the stem with broad, rounded auricles 4. *Honeywort H.*

No radical leaves at the time of flowering. Stems leafy.

Outer involucre bracts imbricated.

Upper stem-leaves sessile or shortly stalked, not clasping the stem.

Upper stem-leaves all tapering at the base, usually narrow 5. *Umbellate H.*

Upper stem-leaves short and broad, rounded at the base 6. *Savoy H.*

Upper stem-leaves clasping the stem.

Auricles of the stem-leaves short and rounded.

Stem-leaves several, ciliate. Pappus dirty-white . . . 7. *Prenanth H.*

Stem-leaves very few, glabrous. Pappus very white and soft *Hawkweed Crepis.*

Auricles of the stem-leaves long and very pointed, or angular *Marsh Crepis.*

* For further details on the proposed species or permanent varieties, see Backhouse's 'Monograph of the British Hieracia,' where the principal British forms are carefully described, and distributed into 33 species.

1. Mouse-ear Hawkweed. *Hieracium Pilosella*, Linn.

(Fig. 594.)

(Eng. Bot. t. 1093.)



Fig. 594.

Stock perennial, with spreading tufts of radical leaves, and creeping, leafy, barren shoots. Leaves much smaller than in the British species, oblong or lanceolate, entire, tapering at the base, and often stalked, green above with a few long hairs, white underneath with a short stellate down. Peduncles radical, with a single head of lemon-coloured flowers, often tinged with red on the outside. Involucres and upper part of the peduncle more or less clothed with a minute and close, whitish down, mixed with short, stiff, spreading black hairs. Achenes shorter in proportion to the pappus than in the other species.

In dry pastures, on banks and roadsides, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Very common in Britain. *Fl. the whole season.* In southern Europe it is very variable, but in Britain presents no difficulties. The only other species with creeping runners ever admitted into our Floras, the orange *H.* (*H. aurantiacum*, Eng. Bot. t. 1469), is a native of the mountains of southern Europe, which may here and there have spread out of some cottage gardens, but is not naturalized; it has radical peduncles, bearing a corymb of small, orange-red flower-heads.

2. Alpine Hawkweed. *Hieracium alpinum*, Linn.

(Fig. 595.)

(Eng. Bot. t. 1110.)

Rootstock short and thick, sometimes shortly creeping, but without creeping leafy stems. Leaves chiefly radical, oblong or lanceolate, slightly toothed, green, with a few long hairs. Peduncles or flower-stems about 6 inches high, simple or rarely divided into 2 simple branches; they usually bear 1, 2, or even 3 small narrow leaves, and a single rather large head of bright yellow flowers. Involucres and

peduncles more or less clothed with long rusty hairs; the outer bracts few and small, as in the *wall H.*

A high alpine or Arctic species, spread over the mountains of northern and Arctic Europe and Asia, and the higher ranges of central and southern Europe. Not uncommon in the Highlands of Scotland and in the mountains of North Wales, and found also in some parts of north-western England. *Fl. summer.* In its ordinary state it is easily enough recognized, but in the Scotch Highlands varieties sometimes occur with broader leaves, more elongated flower-stems, and less shaggy involucre, almost intermediate between this and the *wall H.*, which has induced some botanists to believe that the former may be but a high alpine variety of the latter.



Fig. 595.

3. Wall Hawkweed. *Hieracium murorum*, Linn. (Fig. 596.)

(Eng. Bot. t. 2082; *H. maculatum*, t. 2121, *H. pulmonarium*, t. 2307, and *H. Lapeyrousii*, Suppl. t. 2915.)

The short perennial stock bears a spreading tuft of rather large, ovate or oblong leaves, always stalked, sometimes very obtuse and nearly entire, more frequently pointed and coarsely toothed, especially near the base, sometimes tapering into the stalk, sometimes more or less cordate at the base, usually slightly hairy, and often of a pale glaucous-green underneath. Flower-stems erect, 1 to 2 feet high, rarely quite leafless, usually with 1 or 2 leaves near the base like the radical ones but smaller, and 1 or 2 smaller narrow ones higher up, but occasionally with several leaves. Flower-heads rather large and yellow, usually 3 or 4 only, but sometimes as many as 20 or 30, in a loose terminal corymb. Involucre and peduncles more or less clothed with black,



Fig. 596.

glandular hairs, intermixed with a shorter, rusty-coloured down, whilst the stem is glabrous, or bears in the lower part long, white, woolly hairs, which are sometimes very dense close to the stock. Scales of the involucre narrow, the inner ones nearly equal, the outer few and much shorter.

On banks and old walls, in meadows and rich pastures, bushy places and open woods, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Very common all over Britain. *Fl.* all summer and early autumn. Exceedingly variable in the shape and teeth of the leaves, in colour and hairiness, in the number of stem-leaves and of flower-heads. In alpine situations the leaves are usually much more entire, often obovate. A marked variety, growing in woods and on banks, with a much more leafy stem, has long been distinguished under the names of *H. sylvaticum* (Eng. Bot. t. 2031) or *H. vulgatum*, but it is everywhere connected with the more typical form by a series of intermediates which defy classification. From the *Savoy H.* and the *umbellate H.* it may be known by the radical leaves larger than the stem ones, and persistent at the time of flowering, except where they have been accidentally choked by the surrounding herbage, or withered by drought or other accidental causes.

4. Honeywort Hawkweed. *Hieracium cerinthoides*, Linn. (Fig. 597.)

(Eng. Bot. t. 2378, from a garden specimen.)



Fig. 597.

The habit and radical leaves are those of the mountain varieties of the *wall H.*, but the whole plant is still more glaucous, and has generally more of the woolly hairs, especially about the stock. The flower-stems bear but few rather large flowers, and 1 or 2 leaves usually entire, and always clasping the stem with broad, rounded auricles, and the radical leaves are usually remarkably obovate.

In western Europe, chiefly in the Pyrenees, more doubtfully extending to the western Alps and Corsica. A very doubtful British plant. The only specimens I have seen which really resemble the Pyrenean ones (in the dried state at least) are from the mountains of the west and north of Ireland. The Scotch and English and most of the Irish ones so denominated are usually varieties of the *wall H.* or of the *Savoy H.*

5. Umbellate Hawkweed. *Hieracium umbellatum*, Linn.
(Fig. 598.)

(Eng. Bot. t. 1771.)

The perennial stock only forms buds in the autumn, which do not expand into a tuft of spreading leaves, as in the *wall H.*, but in the following year grow out into a leafy, erect, rigid stem, 1 to 3 feet high. Radical leaves, if any, few and withering away before the time of flowering. Stem-leaves from narrow-lanceolate to oblong, coarsely toothed or nearly entire; the lower ones stalked, and all tapering at the base. Flower-heads rather numerous, on rather short lateral branches towards the summit of the stem, several of which usually (but not always) start from so nearly the same point as to form an irregular umbel, and there are often many others lower down in the axils of the upper leaves. Involucres and peduncles glabrous or shortly downy. Leaves glabrous or hairy underneath; the stems usually more or less clothed at the base with long loose hairs. Scales of the involucre more regularly imbricated than in the *wall H.*, the outer ones usually spreading at the tips.



Fig. 598.

In woods and stony places or banks, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Very common in Britain. *Fl. late summer, and autumn.*

6. Savoy Hawkweed. *Hieracium sabaudum*, Linn.
(Fig. 599.)

(Eng. Bot. t. 349. *H. denticulatum*, Eng. Bot. t. 2122. *H. boreale*, Brit. Fl.)

Although intermediate forms between this species and the last may occasionally be found, yet the two are in most cases easily distinguished. The *Savoy H.*, though stout and equally tall with the *umbellate H.*, is less rigid and more hairy; the leaves larger, broader, and more toothed, the upper ones shorter, always rounded at the base, and sometimes almost clasping the stem; and the flowering branches form a loose



Fig. 599.

corymb, and never an umbel. From the *wall H.*, it is distinguished by the more leafy stem, without radical leaves at the time of flowering, and by the more regularly imbricated involucre.

In woods, under hedges, and in shady places, especially in hilly districts, in Europe, extending eastward to the confines of Siberia, and probably still further into Asia, and northward to the Arctic regions. Distributed generally over Britain, but not so frequent as the *umbellate H.* and especially as the *wall H.* *Fl.* late summer, and autumn.

7. **Prenanth Hawkweed.** *Hieracium prenanthoides*, Vill.
(Fig. 600.)

(Eng. Bot. t. 2235.)



Fig. 600.

Very near the *Savoy H.*, but the stem-leaves are usually long, lanceolate, and slightly narrowed near the base, and always clasp the stem by rounded auricles, and even the stalks of the lower leaves are expanded at the base into the same stem-clasping auricles. The involucre and peduncles have usually more of the short, black, glandular hairs intermingled with the minute down than either the *Savoy H.* or the *umbellate H.*

In woods, shady places, and rich pastures, and on the banks of streams, in northern Europe and the mountain districts of central Europe. Rare in the Highlands of Scotland, and in Wicklow county in Ireland, and very doubtfully extending into England. *Fl.* late summer, or autumn.

XXXVIII. **CHICORY.** CICHORIUM.

Perennials, with the leaves mostly radical, stiff branching stems, and sessile heads of blue flowers. Involucres oblong. Achenes crowned by a ring of minute erect scales.

Besides the British species, the genus only includes the garden *Endive*, generally supposed to be a native of India, but it is very doubtful if it be wild even there, and it may be a mere cultivated variety of the common *wild C.*

1. **Wild Chicory.** *Cichorium Intybus*, Linn. (Fig. 601.)

(Eng. Bot. t. 539. *Succory* or *Chicory*.)

Perennial stock descending into a long tap-root. Stems more or less hispid, 1 to 2 or even 3 feet high. Radical leaves spreading on the ground, and, as well as the lower stem-leaves, more or less hairy and pinnatifid, with a large terminal lobe and smaller lateral ones, all pointed and coarsely toothed; the upper leaves small, less cut, embracing the stem by pointed auricles. Flower-heads in closely sessile clusters of 2 or 3 along the stiff spreading branches, and 1 or 2 terminal ones. Involucres of about 8 inner bracts and a few outer ones about half their length; the florets large, of a bright blue. Achenes smooth or scarcely ribbed, closely packed in the hard dry base of the involucre.



Fig. 601.

In dry wastes, on roadsides, and borders of fields, over the greater part of Europe and Asia, stopping only short of the Arctic regions on the one side, and the tropics on the other. Not uncommon in some parts of England and Ireland, but does not extend far into Scotland. *Fl. summer and autumn.*

XXXIX. **ARNOSERIS.** ARNOSERIS.

A single species, distinguished as a genus from *Lapsane*, as having a different habit, and the achenes crowned with a minute raised border;

and more naturally associated by older botanists with *Hyoseris*, a Continental genus, in which the achenes have a pappus of chaffy scales or bristles.

1. **Dwarf Arnoseris.** *Arnoseric pusilla*, Gært. (Fig. 602.)

(*Hyoseris*, Eng. Bot. t. 95. *Lapsana*, Brit. Fl.)

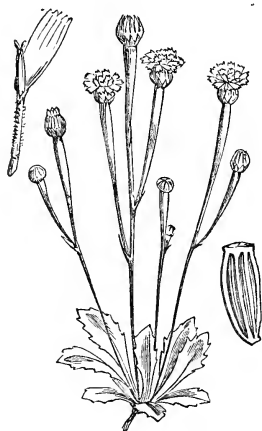


Fig. 602.

Leaves all radical, obovate or oblong, toothed, and glabrous or nearly so. Flower-stalks 4 to 8 inches high, slightly branched, and leafless; the erect branches or peduncles enlarged and hollow upwards, each bearing a small head of yellow flowers.

In dry, sandy or gravelly fields, in northern and central Europe, but not an Arctic plant, and apparently rare in the south. Dispersed over various parts of England, especially in the eastern counties, and occurs in some of the eastern counties of Scotland, but not recorded from Ireland. *Fl. summer.*

XL. LAPSANE. LAPSANA.

Leafy annual, with small yellow flower-heads. Achenes without any pappus or border whatsoever.

The genus consists but of a single species.

1. **Common Lapsane.** *Lapsana communis*, Linn. (Fig. 603.)

(Eng. Bot. t. 844. *Nipplewort*.)

Stem 1 to 2 or 3 feet high, with a few stiff hairs at the base, branched and glabrous upwards. Leaves thin and usually hairy; the lower ones ovate, coarsely toothed, with a few smaller lobes along the stalk; the upper ones small, narrow, and entire. Flower-heads on slender peduncles, in a loose panicle or corymb. Involucre about 3 lines long, of about 8 nearly equal scales of a glaucous green, with a few very small

outer ones. Achenes slightly compressed, with numerous longitudinal nerves.

A common weed in waste and cultivated places, throughout Europe and Russian Asia, except the extreme north. Extends over the whole of Britain, except the northern extremity of Scotland. *Fl. summer and autumn.*



Fig. 603.

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